

**COLUMBIA SHUSWAP REGIONAL DISTRICT
SUBDIVISION SERVICING BYLAW NO. 641, 2010**

SCHEDULE “ ”

**SEWAGE COLLECTION, TREATMENT AND EFFLUENT DISPOSAL
DESIGN GUIDELINES AND STANDARDS
(for Sanitary Systems)**

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PART 1 GENERAL

Standards

- 1.1 All **Works and Services** shall be designed in accordance with this bylaw and the **Approved Standard Drawings**, and constructed in accordance with the most current version of the **MMCD** and Standard Drawings. Unless otherwise specified, the most recent version available to the **Regional District** at the time of approval of all referenced standards, shall apply.
- 1.2 The **Owner** shall also ensure all **Works and Services** are designed in accordance with the requirements of the most current edition of the Environmental Management Act, Municipal Sewage Regulation, the Public Health Act, Sewerage System Regulation, and the Sewerage System Standard Practice Manual.
- 1.3 In addition to the requirements of this bylaw, the applicant is required to obtain approval for designs and authorization to construct from the *Ministry of Transportation and Infrastructure* on any proposed **Highway** crossings or works within its rights-of-way.

Submissions Required Prior to Application for Subdivision

Conceptual Sewage Servicing Plan

- 1.4 A subdivision for which a **Community Sewage System** is required or proposed will not be approved until a Conceptual Sewage Servicing Plan has been prepared by the **Owner's Engineer** and accepted by the **Manager, Environment and Engineering Services**, or his designate, the Ministry of Transportation and Infrastructure, and Ministry of Environment. A Conceptual Sewage Servicing Plan must show the alignment, location and size of sewer mains, manholes, lift stations, treatment facilities and disposal methods in sufficient detail to demonstrate the feasibility of the proposal. The Conceptual Sewage Servicing Plan shall be submitted to the **Regional District's Engineer** for review and comment. The **Owner** shall edit the Conceptual Sewage Servicing Plan as required and shall resubmit it to the **Regional District** for approval. The fee for the **Regional District's Engineer** shall be paid for by the **Owner**.

- 1.5 The **Owner's Engineer** shall consult the **Regional District** to determine the ultimate population to be served and disposal rate assumptions.
- 1.6 Prior to the design of an extension of an existing sewer system owned by the **Regional District**, the capacity of the collection, pumping, treatment and disposal systems, and potential effects of the extension on pre-existing parcels and other properties within the original service area shall be reviewed by the **Owner's Engineer**. This review shall identify and account for any features that may affect, or be affected by the proposed development.
- 1.7 The Conceptual Sewage Servicing Plan shall include a sewage treatment schematic, including the capacity of each treatment process and operating philosophy.
- 1.8 If an Electoral Area Liquid Waste Management Plan has been completed for the community in which the subdivision is proposed, or from which it will be serviced, then the Conceptual Sewage Servicing Plan shall conform to the Liquid Waste Management Plan.

Submissions Required at Time of Application for Subdivision

Regulatory Approvals

- 1.9 The **Owner** shall provide copies of all applications for all relevant regulatory approvals to the **Regional District**.

Design Drawings

- 1.10 Detailed design drawings shall be submitted to the Regional District at the time of subdivision application. The detailed design drawings shall, at a minimum, show the following:
 - a) Location, size, capacity, component details, configuration, controls and alarms for all sewage treatment works;
 - b) Location, alignment, diameter, material, and elevation of all pipes and manholes;

- c) Location, elevation and material of all service connections and appurtenances;
- d) Location, elevation and details of lift stations;
- e) Trench details including material for pipe bedding, backfill and surface restoration;
- f) Structural details for treatment facilities;
- g) Location of geotechnical test pits or boreholes;
- h) Location and component details for all system electrical, control and monitoring equipment (instrumentation, controls, SCADA, effluent quality analyzers, telemetry/communication systems);
- i) Location, size, component details, construction details for all sewage effluent metering equipment; and
- j) Location, grades and alignment of maintenance vehicle access and rights-of-way.

Plans, Reports and Supporting Information

- 1.11 The **Owner** shall provide all environmental, geotechnical, hydrological, hydrogeological, structural, electrical, and any additional information concerning the proposed **Works and Services** to the **Regional District**.
- 1.12 Detailed design and reports shall be submitted to the **Regional District** for review and approval. The **Regional District** may retain the services of a third party **Engineer** to undertake this review. The cost of this review shall be paid by the **Owner**.

Submissions Required Prior to Construction

Regulatory Approvals

- 1.13 The **Owner** shall provide copies of all required approvals to the **Regional District** prior to starting construction.

PART 2 REGULATIONS

General

- 2.1 All sewage systems with daily flows of less than 22,700 L/day are regulated by the Public Health Act and the associated British Columbia "**Sewerage System Regulation**"(**SSR**). Written confirmation is required from the **Environmental (Medical) Health Officer**, confirming that all requirements of the **SSR** have been met.
- 2.2 All sewage systems with daily flows that exceed 22,700 L/day are regulated by the Environment Management Act and the associated "**Municipal Sewage Regulation**" (**MSR**). A compliant **Ministry of Environment** registration and approval is required for sewage systems constructed under the **MSR**.
- 2.3 Where a parcel or proposed subdivision is **NOT** required to be served by a **Community Sewer System**, such parcels shall be served by individual on-site sewerage disposal systems meeting the requirements of the **Sewerage System Regulation (SSR)**.
- 2.4 Where a parcel or proposed subdivision is to be served by a **Community Sewer System**, the design of the **Community Sewer System** shall be in accordance with the requirements of this bylaw, the **Municipal Sewage Regulation (MSR)**, and Electoral Area Liquid Waste Management Plan where applicable.

PART 3 DESIGN CRITERIA

General

- 3.1 These standards are not intended to be a substitute for sound engineering knowledge and experience. The design of sanitary sewage systems and the various system components shall be prepared under the direction of and sealed by a **Professional Engineer**.

Design Flows

- 3.2 Design flows shall be based on ultimate population and full development as anticipated in the Official Community Plan, other land use regulations, or as determined in consultation with the **Regional District**.
- 3.3 Average daily flows to be used for design shall be developed in consultation with the **Regional District**, and shall be based on reliable relevant water consumption records, and occupancy rates where available.

Where relevant records are not available, the following may be used as a guideline:

Residential

450 L/capita/day

Non-Residential

To be determined on a case by case basis

- 3.4 All sanitary sewers shall be designed to carry the peak wet weather flow.

Peak Flows shall be calculated using a Peaking Factor determined by the Harmon Formula:

$$\text{Peaking Factor} = \frac{18 + P^{0.5}}{4 + P^{0.5}}, \quad \text{where } P = \text{Population in thousands.}$$

An infiltration allowance of 0.1 L/s/ha shall apply.

Peak wet weather flow = Average Daily Flow x Peaking Factor + Infiltration

PART 4 COLLECTION SYSTEM COMPONENTS

Hydraulic Design

Gravity Sewers

- 4.1 Gravity Sewer design shall be based on the Manning's Formula, for 3/4 depth,

$$Q = \frac{AR^{0.667} \times S^{0.5}}{n}$$

where, Q = Design flow in m^3 per second
 A = Cross sectional area in m^2
 R = Hydraulic radius in metres
 S = Slope of hydraulic grade line in m/m
 n = Roughness Coefficient

Force Mains

- 4.2 Force Mains shall be designed using the Hazens-Williams Formula,

$$Q = \frac{CD^{2.63} \times S^{0.54}}{278 \quad 780}$$

where, Q = Rate of flow in L/S
 D = Internal pipe diameter in mm
 S = Slope of hydraulic grade line in m/m
 C = Roughness coefficient

- 4.3 Force mains shall enter receiving manholes at crown to crown elevation and direct the flow into the receiving channel without excessive spray and in the direction of the receiving sewer flow.
- 4.4 Air release and vacuum valves, suitable for sewage flow, shall be installed at high points in force main installations. Air release and vacuum valve chambers shall be designed in accordance with the **Approved Standard Drawings**.

Pipe Velocities

Gravity Sewers

4.5 The allowable velocity for gravity sewer pipes shall be:

| | |
|---------|-----------|
| Minimum | 0.76 m/s. |
| Maximum | none |

4.6 Although there is no specified maximum velocity for gravity sewer mains, where velocities exceed 3.65 m/s consideration shall be given to scour and shock hydraulic problems.

4.7 Where upstream sections of sewers require steeper grades to ensure self-cleansing velocity under partial flow conditions. The following design alternatives are acceptable:

- a) The grade of the terminal section of main servicing 6 or less sanitary connections shall be 1% greater than the minimum grade specified in 4.35.
- b) The grade of a sewer main servicing the 7th to 12th sanitary connections shall be 0.5% greater than the minimum grade specified in 4.35.
- c) The grade of a sewer main servicing the 13th sanitary connection, or more, shall be dictated by the minimum grade specified in 4.35.

Force Mains

4.8 The allowable velocity for sewer force mains shall be:

| | |
|---------------------|----------|
| Minimum (cleansing) | 0.9 m/s |
| Maximum | 3.65 m/s |

Minimum Pipe Diameters

Gravity/Force Mains

4.9 The minimum pipe diameters are:

| | |
|--------------------------|--------|
| Gravity collection mains | 200 mm |
| Force mains | 100 mm |

Materials

- 4.10 All sanitary sewer works materials must conform to applicable ***ASTM Standards*** and ***C.S.A. Standards***.
- 4.11 Pipe or sanitary mains shall be polyvinyl chloride and shall conform to ***ASTM Standards*** and ***C.S.A. Standards***.
- 4.12 Fittings and valves shall conform to ***ASTM Standards*** and to the ***Approved Products List***.
- 4.13 All electrical material and equipment must conform to ***C.S.A. Standards and Underwriters Laboratories Standards***.
- 4.14 All service pipe and fittings must conform to ***ASTM Standards*** and ***C.S.A. Standards***.

Depth of Cover

- 4.15 The minimum depth of cover shall be either 1.5 m or depth of frost penetration, whichever is greatest.
- 4.16 Where it is not possible to achieve depths required by 4.15 due to rock or other impediment then the ***Owner's Engineer*** shall:
 - a) Provide adequate insulation that conforms to the Approved Products List, and ensure it is installed in accordance with manufacturer's recommendations or Dow Chemical Canada Utility Line Installation Guidelines; and
 - b) Provide a minimum depth of cover or other means sufficient to provide mechanical protection from external loads or vandalism.
- 4.17 Sewer mains and services shall be of sufficient depth to clear other underground utilities.
- 4.18 All new installation must be deep enough to provide gravity service to standard basement elevations.

Sewer Main Alignment and Location

- 4.19 Sewer mains shall be located in the road rights-of-way as shown on the ***Approved Standard Drawings*** unless otherwise approved by the ***Manager, Environment and Engineering Services***, or his designate.
- 4.20 If it is not practical to locate a sewer main in a road right-of-way, and if approved by the ***Manager, Environment and Engineering Services***, or his designate, then sewer mains shall be located in a utility or ***Regional District*** right-of-way. The utility right-of-way shall have a width of 6 m, or twice the depth of the deepest pipe, whichever is greater.
- 4.21 On straight roads, sewer mains shall have straight alignments with uniform offsets between intersections.
- 4.22 Curved alignments parallel to property lines may be used, but joint deflections must be limited to half the maximum deflection specified by the pipe manufacturer. The radius of curvature shall be not less than 50 m, the pipe grade shall not be less than 1.0% and the design velocity shall not exceed 0.91 m/s.
- 4.23 Sewer mains shall be located such that each property served has at least one side facing the sewer main.
- 4.24 All sewer mains, services, manholes and appurtenances that require maintenance shall be provided with access from a public road. The maintenance access must be sufficiently wide and structurally sound to support maintenance vehicles and must meet the Ministry of Transportation and Infrastructure requirements, including requirements related to location.

Manholes

- 4.25 Manholes are required at all changes in grade, alignment, size and dead-end main.
- 4.26 Maximum manhole spacing shall be as follows:
- | | |
|----------------------------------|-------|
| 375 mm diameter pipe and smaller | 125 m |
| 450 mm to 900 mm | 155 m |
| 1050 and larger | 185 m |
| Any size pipe exceeding 10% | 60 m |

4.27 The crown of the incoming pipe must be the same elevation as the crown of the outgoing pipe where a change in pipe diameter occurs.

4.28 The minimum drop in invert levels across a manhole are:

| | |
|------------------------|---------------|
| Straight run | minimum grade |
| Deflections up to 45° | 50 mm drop |
| Deflections 45° to 90° | 65 mm drop |

Drop Manholes

4.29 An outside drop manhole shall be installed where the elevation of the inlet invert is 600 mm or greater, above the invert elevation of the centre of the manhole channel. Drop manholes shall be designed in accordance with the ***Approved Standard Drawings*** and shall only be used when incoming sewers grades cannot be steepened or where site conditions do not permit otherwise.

4.30 Inside ramps may be utilized when incoming sewer grades cannot be steepened and the elevation of the inlet invert is less than 600 mm above the invert elevation of the centre of the manhole, and if approved by the ***Manager, Environment and Engineering Services***, or his designate.

Clean-outs

4.31 Clean-outs are not permitted in place of manholes except where the sanitary main will be extended for future subdivision/development.

Proximity to Water Mains

4.32 Where a water main crosses a sewer main the installation shall be made in accordance with regional health authority requirements.

4.33 At least 1 m horizontal separation shall be maintained between a sewer main and any existing or proposed ditch or underground utility. At least 3 m horizontal separation shall be maintained between a sewer main and a water main.

4.34 Where a sanitary sewer crosses a water main, the sewer must be at least 0.5 m below the water main, and for 3 m on each side of the sewer, the joints of the water main shall be wrapped with heat shrink wrap in accordance with the ***Approved Products List***. Crossings shall be at close to perpendicular as possible and shall not be at an angle of less than 20°. Crossings shall be laid such that the crossing is made midway between the joints on a full length of water main.

Grade

4.35 Pipes grades shall be at a constant between manholes.

4.36 The minimum pipe grades are:

| <u>Pipe Size (mm)</u> | <u>Grade (%)</u> |
|-----------------------|------------------|
| 150 | 2.00 |
| 150 | 1.00 |
| 200 | 0.45 |
| 250 | 0.33 |
| 300 | 0.25 |

4.37 Where the pipe grade exceeds 20% provide anchorage, joint restraints, trench dams and trench drainage based on the recommendations of an Engineer registered as a geotechnical engineer with the *Association of Professional Engineers and Geoscientists of British Columbia*.

Service Connections

4.38 Service connections size shall be calculated based on designated land use, and as required by the current edition of the *British Columbia Plumbing Code*.

4.39 The minimum service size shall be 100 mm diameter.

4.40 Service connections shall be installed with an inspection chamber at property line for sizes up to 150 mm and with a manhole at the sewer main for sizes greater than 150 mm. Inspection chambers shall be installed in accordance with the ***Approved Standard Drawings***.

4.41 Sanitary sewer services shall be designed to permit standard basement service to all proposed lots. In all cases, the minimum service grade is 2%.

4.42 A service connection entering a manhole shall have its invert elevation at the crown of the highest pipe entering the manhole. The service connection shall discharge in the same direction as the benched flow.

4.43 Unless otherwise approved by the ***Manager, Environment and Engineering Services***, or his designate, service connections shall be perpendicular to the front property line and located on the low side of the lot. Service connections shall not be located under driveways or under travelled areas. Inspection chambers shall be located within 300 mm of the property line on the public side.

PART 5 LIFT STATION COMPONENTS

General

- 5.1 The objective is to minimize the number of sanitary lift stations. All options to avoid the implementation of lift stations must be thoroughly considered. Any proposed use of lift stations must receive prior approval from the **Manager, Environment and Engineering Services**.
- 5.2 Each sanitary lift station shall be individually designed. The **Owner's Engineer** shall submit a pre-design report. The pre-design report shall be approved by the **Manager, Environment and Engineering Services**, or his designate, before detailed design proceeds. The pre-design report shall address, but not be limited to the following items:
- a) Location and elevation, include vehicular access;
 - b) Design shall accommodate flows from the overall catchment area;
 - c) Impact on neighbouring properties, in particular odour and noise control;
 - d) Number and type of pumps, include expansion where applicable;
 - e) Geotechnical investigation, including uplift restraints based on maximum groundwater levels, and dewatering requirements where applicable;
 - f) Location and capacity of power supply, including energy requirements;
 - g) Heating, lighting and ventilation;
 - h) Instrumentation and controls;
 - i) Backup emergency power supply;
 - j) Overall system configuration;
 - k) Maintenance requirements and access;
 - l) Work safe BC compliance; and
 - m) Capital costs, operation and maintenance costs.
- 5.3 Only those system components included on the **Approved Product List** shall be used, unless otherwise approved by the **Manager, Environment and Engineering Services**, or his designate.

Capacity

5.4 Sanitary sewer lift stations shall, at minimum, be designed and sized to accommodate the ultimate flows of the designated overall catchment area(s) for all the major components including the wet well, pumps, electrical, station layout, gravity mains and force mains.

5.5 Minimum storage within the wet well between the high level alarm and the start of overflow storage capacity shall be:

| | |
|--------------------------|---------|
| Average wet weather flow | 2 hours |
| Peak wet weather flow | 1 hour |

5.6 Pumps shall be sized to pump maximum flow conditions with one pump in failure mode. Pump start/stop times shall be as per manufacturer's specifications.

Design Features

5.7 Lift stations shall be designed in accordance with the ***Approved Standard Drawings***.

5.8 Unless otherwise approved by the ***Manager, Environment and Engineering Services***, or his designate, lift stations design shall include, but not be limited to the following considerations and design features:

Location

5.9 The lift station design location shall take into consideration the following:

- a) Maximize the catchment area and allow for future service area expansion;
- b) Topography and vehicular access;
- c) All components shall be above the 200 year + 0.6 m floodplain;
- d) Odour, aesthetics and noise;
- e) Land use and ownership;
- f) Security against vandalism and theft;
- g) Safety for operators and public; and
- h) Overflow potential and environmental impact assessment.

Site Layout

- 5.10 The lift station design site layout shall take into consideration the following:
- a) Vehicular access to lift station hatch and parking for two maintenance vehicles;
 - b) Hydro and Tel services to be underground to structures;
 - c) Site lighting to adequately light all structures;
 - d) Acceptable location of SCADA antenna mast;
 - e) Acceptable landscaping and irrigation plan;
 - f) Perimeter security fencing around all structures;
 - g) Concrete apron for a minimum of 2 m around all structures;
 - h) 50mm water service c/w backflow, shut off and a self draining stand pipe located near the wet well;
 - i) Force main emergency bypass;
 - j) Gravity mains shall connect into a common manhole located within 30m of the force main emergency bypass; and
 - k) Force main flow meter chamber.

Pumps

- 5.11 The lift station pumps shall meet the following criteria:
- a) Minimum 2 pumps capable of operating alternately and independent of each other, with each capable of pumping max flow conditions with one pump in failure mode and operate while one pump is removed for maintenance;
 - b) 3 phase 600 volt where possible;
 - c) Maximum 1800 RPM;
 - d) 1 pump must include a mix flush valve;
 - e) Motors to be premium efficiency, equipped with thermal protection and leak detection.
 - f) Pump motor drives shall be variable frequency drives;
 - g) Pumps shall be non-clogging submersible pump c/w open two vane self cleaning impellor, guide claw, discharge connection and data plate;

- h) Pumps shall be automatically and firmly connected to a watertight discharge connection by a machined metal to metal contact, guided by no less than two guide bars extending from the top of the station to the discharge connection;
- i) No portion of the pump shall bear directly on the sump floor; and
- j) Pumps shall be factory tested prior to delivery.

Lift Station Tank & Appurtenances

- 5.12 The lift station tank and appurtenances shall be designed in accordance with the **Approved Standard Drawings** and **Approved Products List**.

Valve Chamber

- 5.13 Lift stations shall be equipped with an insulated above ground valve chamber designed in accordance with the **Approved Standard Drawings** and **Approved Products List**.

Emergency Backup Generator

- 5.14 Lift stations shall be equipped with an emergency backup generator capable of running the entire system at 100% loading for 36 hours.
- 5.15 Backup generator shall be mounted on a reinforced concrete slab 100mm above finished grade. All mounting shall incorporate theft protection.
- 5.16 Backup generator shall be equipped with digital controller, batteries/charger/rack/cables, circuit breaker, solenoid valve, muffler, weather proof enclosure/sound attenuation foam and vibration isolator pads.
- 5.17 Where Natural Gas supply is available, N/G generator shall be provided. Where N/G is not available a diesel generator shall be provided. Where fuel storage tanks are required, they shall be double walled c/w leak detection monitor, installed in a safe convenient location for refuelling. Fuel lines shall be installed underground through a conduit from the tank to the generator.

Commissioning and Acceptance

- 5.18 Prior to acceptance by the **Regional District** of the completed lift station, a thorough inspection and operational check of the lift station is required. The **Owner's Engineer** shall submit a commissioning plan, including a system check list, personnel required to attend, and proposed schedule the to the **Manager, Environment and Engineering Services**, or his designate for approval.
- 5.19 Only upon the completion and final acceptance of the completed lift station, as per the requirements of this bylaw, will the **Regional District** acquire and operate the completed lift station.

PART 6 TREATMENT AND DISPOSAL SYSTEM COMPONENTS

General

- 6.1 All new **Sewage Disposal Systems** shall provide treatment to meet or exceed the requirements of the Public Health Act and Environmental Management Act.
- 6.2 Extensions or connections to existing **Community Sewage Treatment and Disposal Systems** may not be required to provide additional treatment provided the capacity of the existing system is adequate to incorporate the new lots to meet the criteria in this bylaw.
- 6.3 All **Community Sewage Treatment and Disposal Systems** shall be individually designed. The **Owner's Engineer** shall submit a pre-design report. The pre-design report shall be approved by the **Manager, Environment and Engineering Services**, or his designate, before detailed design proceeds. The pre-design report shall address, but not be limited to the following items:
- a) Location, elevation, vehicular access, security fencing and signage;
 - b) Design flow calculations from the overall catchment area, surge loading;
 - c) Treatment, disposal process, analysis and supporting documentation;
 - d) Impact on neighbouring properties, in particular odour and noise control;
 - e) Future expansion and/or phased implementation plan where applicable;
 - f) Geotechnical and environmental requirements;
 - g) Location and capacity of power supply, including energy requirements;
 - h) Heating, lighting and ventilation;
 - i) Instrumentation and controls;
 - j) Backup emergency power supply;
 - k) Overall system configuration and site plan;
 - l) Maintenance and sludge disposal requirements;
 - m) Work safe BC compliance; and
 - n) Capital costs, operation and maintenance costs.
- 6.4 Only those system components included on the **Approved Product List** shall be used, unless otherwise approved by the **Manager, Environment and Engineering Services**, or his designate.

Washroom Facilities

- 6.5 A single washroom with dual flush toilet and sink shall be installed in a **Community Sewage Treatment and Disposal** Facility, unless this requirement is waived by the **Manager, Environment and Engineering Services**, or his designate.

Capacity

- 6.6 **Community Sewage Treatment and Disposal Systems** components shall, at minimum, be designed and sized to accommodate the ultimate flows of the designated overall catchment area(s) for all the major components including treatment, disposal, emergency storage, pumps, electrical, piping and future expansion connection ability.
- 6.7 Treatment facilities for the equalization of flows and organic shock load shall be considered and addressed at all plants which are critically affected by surge loadings. The sizing of the flow equalization facilities should be based on the maximum design flow volumes.
- 6.8 The shock effects of high concentrations and daily peaks for short periods of time on the treatment process must be addressed.

Approved Treatment Options

- 6.9 Unless otherwise approved by the **Manager, Environment and Engineering Services**, or his designate, only the following treatment options will be approved for a **Community Sewage Treatment and Disposal Systems** for which the **Regional District** will retain ownership.

Aerated Lagoon

- 6.10 The design of an Aerated Lagoon Treatment System shall meet the requirements of the **Municipal Sewage Regulation**. All treatment design, construction, management and operation standards as regulated by the **MSR** shall apply.

Packaged Treatment System

- 6.11 The Membrane Bio-Reactor (MBR) Packaged Treatment system, is an approved method of sewage treatment. The design shall meet the requirements of the **Municipal Sewage Regulation**. All treatment, design, construction, management, and operation standards as regulated by the MSR shall apply.
- 6.12 Only those Packaged Treatment systems included on the **Approved Products List** shall be used, unless otherwise approved by the **Manager, Environment and Engineering Services**, or his designate.
- 6.13 MBR Treatment Systems disposing effluent to ground shall be designed to meet Class 'A' effluent quality requirements as defined in the **MSR**.
- 6.14 The rated treatment capacity shall be specified by the manufacturer.
- 6.15 Sludge storage shall be designed to provide a minimum of 21 days of sludge produced at maximum daily flows. A centrifuge shall be installed to reduce pumping frequencies and reduce water content of the sludge.

Emergency Backup Generator

- 6.16 Treatment facilities shall be equipped with an emergency backup generator capable of running the entire system at 100% loading for 36 hours.
- 6.17 Backup generator shall be mounted on a reinforced concrete slab 100mm above finished grade. All mounting shall incorporate theft protection.
- 6.18 Backup generator shall be equipped with digital controller, batteries/charger/rack/cables, circuit breaker, solenoid valve, muffler, weather proof enclosure/sound attenuation foam and vibration isolator pads.
- 6.19 Where Natural Gas supply is available, N/G generator shall be provided. Where N/G is not available a diesel generator shall be provided. Where fuel storage tanks are required, they shall be double walled c/w leak detection monitor, installed in a safe convenient location for refuelling. Fuel lines shall be installed underground through a conduit from the tank to the generator.

Effluent Disposal

- 6.20 All treated effluent disposal shall meet the requirements of the ***Municipal Sewage Regulation***.
- 6.21 Where pumping of treated effluent is required, the pumping facility shall conform to Part 5 of this bylaw.

Discharge Restrictions

- 6.22 A ***Community Sewage Treatment and Disposal System*** shall not discharge effluent directly to a watercourse, except as approved by the Ministry of Environment, and as supported in an Electoral Area Liquid Waste Management Plan.

Commissioning and Acceptance

- 6.23 Prior to acceptance by the ***Regional District*** of the completed treatment facility, a thorough inspection and operational check of the treatment facility is required. The ***Owner's Engineer*** shall submit a commissioning plan, including a system check list, personnel required to attend, and proposed schedule to the ***Manager, Environment and Engineering Services***, or his designate for approval.
- 6.24 Only upon the completion and final acceptance of the completed treatment facility, as per the requirements of this bylaw, will the ***Regional District*** acquire and operate the completed treatment facility.

PART 7 NOISE AND ODOUR CONTROL

- 7.1 Noise levels for facilities must not exceed 65 dB at property line or 20 m away whichever is closer.
- 7.2 Corrosion and Odour controls must be considered in all designs. Analysis for potential odour and sulphides is required. Odour criteria shall be:
- a) At 10m from any gravity main, force main, manhole, and lift station or other sewer facility (summer conditions, wind between 2-10 km/h), 1.0 odour units.
 - b) Where sewer facilities are close to houses, parks or walkways, 0.0 odour units.
- 7.3 Dissolved sulphide maximum limit at any point in the system is to be 0.5 mg/l. however, for new tie-ins to an existing ***Regional District*** system, the maximum limit is 0.3 mg/l.

PART 8 ELECTRICAL, CONTROL, AND SCADA SYSTEM COMPONENTS

- 8.1 Only those system components included on the ***Approved Products List*** are acceptable for use, unless otherwise approved by the ***Manager, Environment and Engineering Services***, or his designate.
- 8.2 All control, communication and SCADA systems must be compatible with the ***Regional District*** SCADA system.
- 8.3 Standby power is required to ensure sewage is pumped and treated during a power outage.
- 8.4 All electrical work shall comply with all adopted revisions, editions and versions, of codes and standards applicable to the location of work including:
- a) C22.1, Canadian Electrical Code Part 1;
 - b) British Columbia Building Code;
 - c) Work Safe BC, Occupational Health and Safety Regulations;
 - d) Local By-laws and Regulations; and
 - e) Specified reference standards.
- 8.5 The ***Owner's*** electrical contractor must ensure that:
- a) All required approvals and permits are obtained from the local inspection authorities and utility providers for electrical work;
 - b) All work is done in accordance with good practice and by tradesman accredited and skilled in the performance of electrical work;
 - c) All personnel working on or around electrical equipment are able to do so in a safe manner; and
 - d) All electrical equipment installed bears an approval label acceptable in the Province of British Columbia.