Appendix P

WDOE Review Comments

Table G1-1. Requirements for Engineering Report and Facility Plan – Modified for General Sewer Plan review

Element	Requirements		Location in General Sewer Plan
	Engineering Report	**Facility Plan**	
Site Description, Problem Identification, and Map	Well documented.	Same as engineering report.	Reference **Chapter 1** for plan background, collection system overview, and related general information.
Description of Discharge Standards	Well documented.	Same as engineering report.	Discharge standards for the collection system are presented in **Chapter 3**.

Background Information	Existing Environment
	• Water, air, sensitive areas:
	  • Flood plains
	  • Shorelands
	  • Wetlands
	• Endangered species/habitats
	• Public health
	
	Demographics and Land Use
	• Current population
	• Present wastewater treatment
	• AWT need evaluated
	• I/I studies
	• CSOs
	• Sanitary surveys for unsewered areas
		Existing Environment
		Same as engineering report, plus identification of:
		• Prime or unique farmland
		• Archaeological and historical sites
		• Any federally recognized "wild and scenic rivers"
		• Threatened species
		
		Demographics and Land Use
		Same as engineering report, plus specific determinations that I/I is not excessive (that is, not less expensive to remove it than treat it at plant).
			Existing Environment
			Background information regarding the collection system is presented in Section 1.3 and **Chapter 2**.
			
			Demographics and Land Use
			Reference **Chapter 2** and **Section 3.6** for information regarding I/I. Unsewered areas are presented in **Section 2.2**.

Future Conditions	Demographics and Land Use Projected population levels • Appropriateness of population date source, zoning changes • Future domestic and industrial flows, and flow reduction options • Future flows and coding • Reserved capacity • Future environment without project	Same as engineering report, plus discussion of whether recreation and open space alternatives could be incorporated.	**Section 2.11** presents expected population growth and **Chapter 6 and 7** present future domestic and industrial flows, and provide figures for future conditions.

Element	Requirements		Location in General Sewer Plan
	Engineering Report	**Facility Plan**	
Alternatives	• List specific alternative categories, including no action • Collection system alternatives • Sludge management/use alternatives • Flow reduction • Costs • Environmental impacts • Public acceptability • Rank order • Recommended alternative	Same as engineering report, plus description of innovative and alternative technologies [that is, those saving energy and nonconventional treatment (land application, etc.)].	**Chapter 6** presents Existing, Committed and Master plan flow scenarios with identified issue areas/bottlenecks and corrective alternatives. **Chapter 7** presents identified CIP projects with a timeline identifying order of completion.
Final Recommended Alternative	• Site layout • Flow diagram • Sizing • Environmental impacts • Design life • Sludge management • Ability to expand • O&M/staffing needs • Design parameters • Feasibility of implementation	Same as engineering report.	Summarized in **Chapter 7** with corresponding CIP packet figures included in **Appendix I**.
Financial Analysis	• Costs • User charges • Financial capability • Capital financing plan • Implementation plan	Same as engineering report.	Reference **Chapter 8** for the financial plan.

Other	• Water quality management plan conformance • SEPA approval • List required permits	Same as engineering report, plus state-approved SERP compliance, including: • Environmental issues analysis • Documentation that the project is identified in a sewer general plan • Capital improvement plan • Documentation of adequate public involvement process	**Chapter 10** presents the pretreatment program for the collection system and its role in controlling the entry of pollutants into the wastestream. **Appendix J** presents the completed SEPA checklist that was submitted to the lead agency (City of Richland). Current Status: **In review.**

Table G1-2. Explanation of Engineering Report Requirements (Rev. 11/2007) – **Modified for General Sewer Plan review**

Text from WAC 173-240-060	Explanation	Location in General Sewer Plan
060(1) Planning Requirements		
The engineering report for a domestic wastewater facility shall include each appropriate (as determined by Ecology) item required in WAC 173-240-050 for general sewer plans unless an up-to-date general sewer plan is on file with Ecology. Normally, an engineering report is not required for sewer line extensions or pump stations. See WAC 173-240-020(13) and 173-240-030(5). The facility plan described in 40 CFR 35 is an "engineering report."	The report must comply with an up-to-date general sewer plan (WAC 173-240-050) that is on file with Ecology. The community must certify that its general sewer plan adequately addresses the current conditions and service area. If Ecology does not have an adequate, up-to-date, existing general sewer plan, it will identify those portions of Section 050 that include in the engineering report. Where no up-to-date general sewer plan exists, the entity may expand the engineering report to meet the requirements for a general sewer plan, including local approval requirements in Chapters 35.63, 36.70, 36.94, and 56.08 RCW. Ecology does not normally require an engineering report for sewer line extensions or pump stations that conform with an Ecology-approved general sewer plan, where Ecology does not provide financial assistance.	Reference **City of Richland General Sewer Plan** (2015).
060(2) Sufficiently Complete		
The engineering report shall be sufficiently complete so that plans and specifications can be developed from it without substantial changes.	"Sufficiently complete" as used in the regulations is defined to mean the report must contain sufficient design information to allow an engineer not involved in writing the report to produce construction drawings for the facility as envisioned by the report writer without any need for process change or more than minor unit-sizing modifications. "Substantial change" means a change in the selected treatment process, facility size, design criteria, performance standards, or environmental impacts, or an increase in total project cost. A substantial change requires an amendment to the approved engineering report. "Adequate detail" means that the report includes suitable attention to the individual elements and components that make up the whole proposed project.	**Chapters 6 and 7** present each issue area as determined during each modeling scenario and includes discussion regarding a proposed project solution. Detailed opinions of probable cost are included at the end of **Appendix I** corresponding to each CIP project.
060(3) Minimum Information Required		
The engineering report shall include the following information, together with any other relevant data as requested by Ecology:		

(a) The name, address, and telephone number of the owner of the proposed facilities, and their authorized representative.	The report must include the name, address, and telephone number of the owner and the owner's representative. The named person or position must have the authority to sign contracts relating to this project. Examples of the owner's representative include the mayor, chair of the city council sewer committee, city manager, public works director, etc. Additionally, the entity may identify a specific project contact person other than the legal representative.	The owner of the collection system is the City of Richland. The appropriate contact is: Jay Marlow, PE, Public Works Capital Projects Manager City of Richland (509) 942-7500 jmarlow@ci.richland.wa.us P.O. Box 190 MS 26 Richland, WA 99352
(b) A project description including a location map and a map of the present and proposed service area.	The project description includes the where, what, and why of the report and documentation of the need for the proposed project. Include a location map of the project area, along with a map showing the current and proposed sewer service area. Scale the map(s) so that at least one map shows the complete, current, and proposed service areas along with the relationship of this service area to adjacent service areas. One map must show the existing collection system changes and the proposed locations of land applications of wastewater. Include a current zoning map for the service area to support the population and waste load projection process.	The service area for the sewer collection system is shown in **Figure 2-1** and presented in **Chapter 1**.
(c) A statement of the present and expected future quantity and quality of wastewater, including any industrial wastes which may be present or expected in the sewer system.	This includes an analysis of the current waste load (flow, BOD, TSS, etc.) received by the treatment plant, its sources (the percentages of domestic, commercial, and industrial dischargers), the characteristics of industrial discharges/pretreatment, the current I/I flows, CSOs as defined in Chapter 173-245 WAC, diurnal flow and loading variations, and seasonal load and flow variations. Include at least one full year of CURRENT wastewater flow and loading data to justify appropriate design parameters for the new system (more than one year of data is preferable). Data must include sufficient detail to demonstrate the degree of flow and loading variability expected. Wastewater characterization must also identify any constituents that may have a detrimental impact on any proposed unit process (i.e., chemicals toxic to microbes, constituents that may interfere with disinfection, high variability in peak flows and loading). Proponents must ensure that laboratory data were obtained from an Ecology-accredited laboratory. Proponents must obtain flow data from meters that have a documented history of proper calibration. Include the location of influent and effluent sampling, the type of samples taken, and the locations of treatment process return streams. To demonstrate that the data is truly representative of current conditions, RCW 90.48.495 requires the entity consider water conservation measures in sewer plans. Include a discussion of water conservation measures considered or under way and their anticipated impact on public sewer service. Estimate the future (normally 20 years from the date of the report) waste load and sources of wastewater including the above items. Base the estimates on the present (or known future) zoning pattern, council of government's population forecasts, historical population trends, existing industrial users, and anticipated future industrial wastewater sources.	Flows and loads are presented in **Chapter 3**.

(d) The degree of treatment required based upon applicable permits and regulations, the receiving water, the amount and strength of wastewater to be treated, and other influencing factors.	Include a copy of the current discharge permit and any compliance orders in the engineering report. For new discharges, include a draft permit. Use the evaluation results of Sections 3(e), (h), and (l) to estimate the degree of treatment needed in lieu of the existence of a current permit or a draft permit prepared by Ecology. At a minimum, the engineering report must contain an evaluation of the WWTP discharge compliance with water quality criteria (Chapter 173-201A WAC). For municipal WWTPs, this means an analysis of ammonia and chlorine that may indicate the need for nitrification or dechlorination. If the receiving water is listed on the 303(d) list as impaired, the analysis must include the parameters identified in the impairment listing. Design values must align with waste load allocations established in a TMDL, if available. Additionally, the report must evaluate the effects of industrial discharges to the collection system on the final effluent, including the potential for toxic materials to pass through the treatment facility to the final effluent or sludge. The engineering report must determine if the discharge from a proposed system will cause a measurable change in existing water quality measured at the boundary of the chronic mixing zone if one has been authorized. A measurable change is any one of the following: 1) Temperature increase 0.3 C. or greater. 2) Dissolved oxygen decrease of 0.2 mg/L or greater. 3) Bacteria count increase of 2 cfu or greater. 4) pH change of 0.1 units or greater. 5) Turbidity increase of 0.5 NTU or greater or. 6) Any detectable increase in the concentration of a toxic pollutant or radioactive substance. The proponent must consult with regional Ecology staff to determine the level of analysis needed to comply with the Antidegradation provisions of WAC 173-201A-300 to 330.	Not applicable.

(e) A description of the receiving water, applicable water quality standards, and how water quality standards will be met at the boundary of any applicable dilution zone. (173-201A-10Q WAC)	Give the name, location (river mile, latitude/longitude, waterway segment number, township/range, etc.), and water quality classification of the proposed receiving water. Summarize any existing receiving water data (monitoring stations reporting to STORET, CRMS, USGS reports, NOAA reports, FERC license reports, data collected for this report, etc.). Include data collected for this report in an appendix to the report. For fresh water streams and rivers, determine and provide the 7Q10 (seven-day, ten-year recurrence low flow) flow in the report. This is the flow used for calculating mixing zone sizing in streams and rivers. For salt water and estuaries, determine and provide current velocity, appropriate salinity, density, and temperature profile conditions in the report. This information is then used to design and evaluate the size and shape of allowable mixing zones. Evaluate toxic chemicals in the effluent (toxic pollutant scan may be required). This includes an evaluation of the effects of toxic chemicals on migratory fish (i.e., barrier to fish migration). Evaluate the applicable numerical Water Quality Criteria (EPA) and determine which criteria are limiting for this discharge (see Ecology's "Permit Writer's Manual"). The NPDES permit may contain requirements for whole effluent toxicity testing and limits (WET rule, Chapter 173-205 WAC). Identification of the various chemicals that may be present in the discharge and the species present in the receiving water may affect the need or frequency of biomonitoring WET testing. In salt water, evaluate not only the effects of chemical discharges, but also the impacts of bacterial discharges on shellfish beds (certification or decertification). Refer to the criteria and information in the DOH documents "Special Sewage Works Design Consideration for Protection of Waters Used for Shellfish Harvest," "Water Supplies or Other Areas of Special Public Health Concern," and "Shellfish and Domestic Wastewater Discharge Outfall Projects," Oct. 1995 (interagency permit streamline). For groundwater discharges, address the minimum requirements of the hydrogeologic study. These requirements are listed in E3-4 and are fully described in the "Implementation Guidance for Ground Water Quality Standards" (Ecology, 1996; Revised October 2005).	Not applicable.

(f) The type of treatment process proposed, based upon the character of the wastewater to be handled, the method of disposal, the degree of treatment required, and a discussion of the alternatives evaluated and the reasons they are unacceptable.	Consider at least one of each of the following wastewater treatment categories and options: fixed growth processes, suspended growth processes, land treatment processes, lagoons, innovative treatment processes, nonstructural alternatives (operational changes), and no action. The report must include the no action alternative. Rank the alternatives considered (with their reasons) according to their ability to meet the receiving water quality standards, costs, and other objectives of the engineering report. From this group of ranked alternatives, select for further development and evaluation a top group of three to five distinct, final alternatives that meet the report's objectives. Further evaluation includes environmental impact, applicability to available site(s), cost effectiveness (capital cost and present worth cost), ease of operation, and other criteria deemed important by the community. Base costs on EPA cost curves, CAPDET analysis, or any other cost estimating method acceptable to Ecology. A final alternate recommended for implementation should rank first in this further evaluation. The selection of the recommended alternate includes a discussion of why the other alternates were not selected. If the selected alternative is not the lowest cost effective alternative, provide discussion to support the decision to not choose the cost effective alternative. If the proponent will seek Ecology funding from the Centennial Clean Water Fund and/or the Sate Revolving Fund, project eligibility may be limited if the least cost alternative is not selected. Consult with regional Ecology staff in advance to identify how alternative selection may impact project eligibility.	Not applicable.
(g) The basic design data and sizing calculations of each unit of the treatment works. Expected efficiencies of each unit, the entire plant, and character of effluent anticipated.	Provide basic design data and sizing calculations for all of the final alternates as part of the ranking process. Use the data to estimate construction and operation and maintenance costs for cost comparisons as required in 3(p) below. The detailed sizing calculations and design criteria used for sizing the selected alternative treatment systems must agree with the appropriate chapters of this manual or other authoritative reference. Thoroughly justify any deviation from the design criteria in this manual. Section 3(c) above provides the basic hydraulic and pollutant loading data to be used for sizing the treatment systems. Describe the age, capacities, and adequacy of all existing treatment units used in the upgraded facilities.	Design data used for the CIP project alternatives is presented in **Section 6.5.**

(h) Discussion of the various sites available and the advantages and disadvantages of the site(s) recommended. The proximity of residences or developed areas to any treatment works. The relationship of a 25-year and 100-year flood to the treatment plant site and the various plant units.	This is part of the alternative evaluation process (c) through (f). When evaluating multiple potential treatment plant sites, assess their topography, flood potential, impacts to existing wetlands, soils suitability for construction, zoning, and proximity to residential areas. Do not limit flood analysis to determining whether or not a site is included within a flood plain mapped on a FEMA Flood Insurance Rate Map (FIRM). Evaluate the flooding potential of any drainage way passing through or near the site for site flooding potential. Show the existence of wetlands on a proposed site on the site map. Mapping the extent of wetlands may require the use of a wetlands specialist. Compare wall and floor elevations to potential 100-yr flood elevations to ensure that basins are not over-topped or buildings flooded if major flooding occurs. Consider using a continuous hydrologic and hydraulic model with long term (20+ years) precipitation record to model the development and its contributing drainage area to evaluate the hydraulic capacity of the conveyance system and flooding potential. During the planning stage, conduct adequate soils analyses at the final alternate sites to understand the ability of the soils to structurally support the proposed structures or provide the wastewater treatment required. That is, perform enough soils analyses to ensure that during design or construction a "changed site condition" clause does not need to be invoked because the soils are unable to perform as required).	An assessment of the Master Plan scenario model results is presented in **Section 6.7.2**.
(i) A flow diagram showing general layout of the various units, the location of the effluent discharge, and a hydraulic profile of the system that is the subject of the engineering report and any hydraulically related portions.	Proponent must present flow diagrams for each of the final alternates considered. Reports must include a schematic flow diagram showing all wastewater liquid and solids flow paths. Include proposed sampling locations as well as a scaled site layout (with the site topography) that shows how proposed treatment units fit on the land available. Develop hydraulic profile(s) in detail for the selected alternate. Include the hydraulic profile for at least the high plant flow and high receiving water flow/elevation and low plant flow conditions. Include hydraulic profiles for other critical flow conditions if necessary to justify unique design elements or operating conditions.	**Appendix A** includes figures of the overall collection system and details the model results for depth over diameter (d/D) and reserve capacity for the collection system for each scenario.

(j) A discussion of infiltration and inflow problems, overflows and bypasses, and proposed corrections and controls.	Evaluate the existing treatment plant flows showing the degree of I/I in the collection system. The analysis must include a review of the age and characteristics of the existing sewerage system, flow monitoring in the system and location of sewer lines with high I/I. A complete evaluation of I/I in a system requires at least one year of testing to establish the baseline flows and conditions for further evaluations. Refer to section C1-7 for further guidance on conducting I/I investigations. Identify discharge locations for sanitary sewer overflows (SSOs) and combined sewer overflows (CSOs) on a map and discuss their current frequency and impacts on receiving water. Include any recommendations of how to eliminate SSOs and minimize CSOs and their effect on the receiving water. Ecology will not approve plans that will result in an increase of the frequency or impact of SSO and/or CSO discharges. Chapter 173-245 WAC requires municipalities to submit a CSO reduction plan if their sewer system contains any CSOs. The final project recommendation must include plans for I/I reduction, SSO elimination, and incorporate recommendations presented in a CSO control plan that conform to Chapter 173-245 WAC.	An I/I evaluation of the collection system is presented in **Section 3.5**.
(k) A discussion of any special provisions for treating industrial wastes, including any pretreatment requirements for significant industrial sources.	Identify any industrial wastes that require special handling by the treatment plant and discuss proposed methods for handling those wastes. Reference appropriate treatability studies for existing industrial wastewaters to identify the potential to interfere with proposed treatment plant unit processes. Identify the extent of industrial pretreatment needed to ensure stable plant operation and water quality protection.	The City of Richland does not have any known industrial users with discharges that are expected to affect plant performance. **Chapter 10** presents the pretreatment program currently in use.
(l) Detailed outfall analysis or other disposal method selected.	See 3(e) above. The outfall location and diffuser design, whether existing or proposed, must ensure effluent discharge will meet applicable water quality standards presented in Chapter 173-201A WAC. The report must include a detailed outfall analysis to justify that water quality standards will be met at the point of discharge or at the boundaries of acute and chronic mixing zones as defined by 173-201A-400 WAC. The analysis must be consistent with Ecology's "Guidance for Conducting Mixing Zone Analyses" (Publication 97-e12) and EPA's "Technical Support Document for Water Quality-based Toxics Control". Ecology encourages the use of computer dilution models, such as PLUMES or CORMIX, that are calibrated to actual conditions in the field to develop the outfall analysis. The analysis must include all critical flow and loading situations expected for the facility. For river discharges the low flow must represent the 7Q10 flow or other regulated low flow. Marine discharges must use mean lower low water elevation and seasonal conditions that result in the greatest stratification in the water column. Ecology considers the outfall and diffuser a basic unit of the treatment system and proponents must include them in the data for 3(g) above. For land application of wastewater, see (4) below.	Not applicable.

(m) A discussion of the method of final sludge disposal and any alternatives considered.	Include a residual solids management plan that evaluates the expected solids quantities and quality, and the potential disposal or beneficial use options (including regional biosolids disposal and utilization options). The management plan includes evaluating sludge treatment options at the plant and relating these treatment options to the sludge disposal or biosolids utilization options considered. The proponent must ensure compliance with applicable laws and regulations (40 CFR 503 and 258), Ecology's Minimal Functional Standards and local permits. Guidance on the content of a residual solids management plan is available in Chapter S of this manual and from Ecology's Regional Biosolids Coordinator. Determine solids mass balance for the treatment plant as an important part of the process of developing and comparing both the sludge treatment and wastewater treatment alternatives. Present a ranking of the various residual solids handling alternatives considered and identify the preferred alternative and actions necessary for implementation. Also present the reasons for not selecting the other alternatives. Part of the alternatives analysis referred to in 3(f) and (g) above includes the selection of a residual solids treatment and disposal process.	Not applicable.
(n) Provision for future needs.	The proponent must discuss the future wastewater needs of the community with an emphasis on identifying potential alternatives to accommodate for future growth. The discussion should include the potential to expand an existing treatment plant on a given site, construction a new plant on an alternate site (including locations to construct a new facility), and the ability to extend the sewerage system. Identify the population, industrial, and commercial growth expectations of the service area. Growth expectations should consider high, medium, and low growth profiles. The time frame for this evaluation may range from five years for a phased project to 20 years for complete build out of the service area. Ecology recommends that proponents include 20 years of treatment capacity in each project.	Future growth of the collection system is presented in **Section 6.6 and Section 6.7** provides a proposed phasing plan.
(o) Staffing and testing requirements for the facilities.	The comparison of alternatives must discuss the potential staffing needs of each final treatment alternative, including staffing levels and specialization needs of each. EPA's document "Estimating Staffing for Municipal Wastewater Facilities" provides an acceptable estimating tool for this purpose. Evaluate the facility during the design phase facility classification under Chapter 173-230 WAC. The staffing plan must include at least one operator matching the facility classification as the operator in responsible charge. Describe the selected alternative in adequate detail to evaluate the facility classification.	Existing staffing levels are compared to estimated staffing needs for the selected alternative in **Chapter 9**.

(p) An estimate of the costs and expenses of the proposed facilities and the method of assessing costs and expenses. The total amount shall include both capital costs and also operation and maintenance costs for the life of the project, and shall be presented in terms of total annual cost and present worth.	The cost estimate must be the engineer's best opinion of probable final costs based on an intermixed estimate of quantities and costs. Proponents interested in obtaining construction financial assistance from Ecology must provide a project financing (user charge) evaluation. The financing evaluation must include the potential Ecology grant or loan funding in addition to an analysis that does not include any Ecology grant or loan funding. Also include a present worth analysis of O&M costs for each of the final alternates as part of the ranking process.	Detailed cost opinions are presented at the end of **Appendix I** and summarized in **Chapter 7**. Project financing is presented in **Chapter 8**.
(q) A statement regarding compliance with any applicable state or local water quality management plan or any such plan adopted pursuant to the federal Water Pollution Control Act as amended.	Identify any applicable water quality management plan connected to the proposed project and discuss how the project is connected to that plan.	Water quality standards for the collection system are presented in **Chapter 2 and 3.**
(r) A statement regarding compliance with SEPA and NEPA, if applicable.	Prepare an environmental report that identifies the potential environmental impacts of the project. Include a copy of the completed SEPA checklist along with the appropriate adopted SEPA determination (Determination of Non-significance, mitigation plan, Environmental Impact Statement, etc.) in the engineering report. The action taken that requires SEPA is the adoption of the engineering report and its recommended project. For federally funded projects, excluding SRF Loans, append a NEPA environmental assessment or reference to an applicable FEIS and final NEPA action in the engineering report. The local government must make final SEPA declaration prior to approval of the engineering report. If the project anticipates Ecology SRF or Centennial Grant funding, the proponent must also complete the SERP process. This process is in addition to the SEPA process, but can be replaced by NEPA. See G1-2.6 for more information about SERP.	**Appendix J** presents the completed SEPA checklist that was submitted to the lead agency (City of Richland). Current Status: **In review.**
060(4) Land Application Discharges		

The engineering report for projects utilizing land application, including seepage lagoons, irrigation, and subsurface disposal, shall include information on the following together with appropriate parts of subsection C(3) of this table, as determined by Ecology: *(a) Soils and their permeability.* *(b) Geohydrologic evaluation of such factors as:* *(i.) Depth to ground and ground water movement during different times of the year.* *(ii.) Water balance analysis of the proposed discharge area.* *(iii.) Overall effects of the proposed facility upon the ground water in conjunction with any other land application facilities that may be present.* *(c) Availability of public sewers.* *(d) Reserve areas for additional subsurface disposal.*	Section (4)(c) refers to the availability of public sewers connected to a conventional treatment facility. One criterion (especially for grant/loan considerations) used to compare conveyance and treatment at a WWTP versus treatment on-site is a 20-year present worth calculations. If the present worth to convey wastewater to a larger, conventional facility is equal or lower than treatment in an approved on-site wastewater treatment facility, then the entity should select conveyance and treatment. If an approved on-site treatment process costs less (present worth basis), site soils can provide drainage, and the entity has addressed other environmental and local concerns, the proponent should select the on-site treatment. The selection process is related to long-term reliability of the treatment and disposal process. Section (4)(d) requires adequate area for 100% replacement of the drain field if the entity selects subsurface disposal (see DOH's "Design Standards for Large On-Site Sewage Systems"). See Chapter E3 for determining the ground water quality criteria for land application process. NOTE: WAC 173-240-035 restricts the use of subsurface wastewater disposal systems if other methods are available. Satisfying the above requirements will satisfy the reasonability test (WAC 173-240-035).	Not applicable.