

**QUALITY CONTROL CHECKLIST FOR  
PRELIMINARY ENGINEERING REPORTS**

Developed by Infrastructure for Nevada Communities (INC) Working Group

\_\_\_\_\_  
Name of System

\_\_\_\_\_  
Name of Engineering Firm

\_\_\_\_\_  
Name of Purveyor (Owner of System Contact)

\_\_\_\_\_  
Name of PE of PER Documents

\_\_\_\_\_  
Mailing Address

\_\_\_\_\_  
Mailing Address

\_\_\_\_\_  
City State ZIP

\_\_\_\_\_  
City State ZIP

Type of Project (Check all that apply)

Transmission mains and distribution systems

Water Treatment

Well Construction

Well Renovation

Storage

Booster Pump Station

Wastewater Collection System

Wastewater Treatment

Other \_\_\_\_\_

Site Visit with Funding Agency Representative, Owner Representative and Consulting Engineer completed. Meeting minutes attached.

PE's Seal

\_\_\_\_\_  
Engineer Signature Date

## Growth Projections

All Preliminary Engineering Reports for Water and Wastewater projects must contain the following:

	<u>Completed</u>	<u>N/A</u>	<u>Pg. Referenced</u>
If growth forecasts exceed 1%, the engineer must consider a multitude of factors that lead to increasing/decreasing population/demand. These factors include economic conditions/outlook for core industries (e.g. mining), regional and shrinkage trends, new building permits, increasing/decreasing school enrollment... etc.	<input type="checkbox"/>	<input type="checkbox"/>	_____
If growth cannot be forecast with certainty, a phased approach shall be considered for each reasonable alternative.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Customer commitment to the project must be identified based on the existing population. This section should also identify means that will be utilized to encourage customer/population commitment and participation to the project	<input type="checkbox"/>	<input type="checkbox"/>	_____
If there is a proposed change to the district service area, governing law must be fully researched and comments received from County DA/legal counsel, and any costs associated with expansion should be included in the project.	<input type="checkbox"/>	<input type="checkbox"/>	_____
If there are small water systems within the boundaries of the service area, how do you propose to connect these systems and at what cost, if any. Is consolidation of service area being considered?	<input type="checkbox"/>	<input type="checkbox"/>	_____
Does the applicant own adequate water rights to support the project	<input type="checkbox"/>	<input type="checkbox"/>	_____
 <b><u>Miscellaneous Information – All Projects</u></b>			
Accessibility – are the applicant’s customer service facilities fully Accessible and in compliance with the Uniform Federal Accessibility Standards, and the Americans with Disabilities Acts guidelines. If not Is the cost to bring in compliance included in the report	<input type="checkbox"/>	<input type="checkbox"/>	_____
Include a map indicating ownership of the land impacted by the Proposed project.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Feature Locations – provide the coordinates (Lat/Long,) of major Features (tanks, wells, sources, utility headquarters etc..) The preferred Format is NAD 83, ddd.ddddd. Note any common format is acceptable, EXCEPT Start Plane Coordinates.	<input type="checkbox"/>	<input type="checkbox"/>	_____

## Cost Estimates

	<u>Completed</u>	<u>N/A</u>	<u>Pg. Referenced</u>
Construction estimates must be based on the anticipated mid-point of construction and developed in considerable detail. Major equipment pieces like stand-by generators, SCADA systems, etc., must be listed and estimated separately. Facility costs should be based on square footage as depicted in a floor plan sketch. It may be necessary to include an equipment layout on the sketch. Prices (unit and lump sum) should take into consideration procurement methods. Include the basis of unit price costs (means, previous bids in locality, etc.). Does the operation have all necessary equipment to operate the facility, including computer billing.	<input type="checkbox"/>	<input type="checkbox"/>	_____
The scope of all non-construction costs (legal, administrative, interim financing, title companies, land acquisition, bond counsel, etc.) must be defined before costing the item; percentages of construction costs are not acceptable.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Engineering costs should be based on a percentage of <b><u>construction costs</u></b> with written justification.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Construction contingencies should be between 5% and 10%. Detailed written justification must be made for contingencies outside of this range	<input type="checkbox"/>	<input type="checkbox"/>	_____
Include the costs of land acquisitions; private, BLM, FS, are there on-going annual costs associated with this acquisition or lease, if so have they been included in the annual O&M costs.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Include cost estimate for O&M cost impacts reductions or increases based on system improvements.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Include cost impacts of other funding (i.e. AB 198 depreciation)	<input type="checkbox"/>	<input type="checkbox"/>	_____
Decision Matrix – provide a matrix or table. The Matrix should Include environmental considerations, capital costs, present worth Costs, constructability, needs of the applicant and other pertinent issues	<input type="checkbox"/>	<input type="checkbox"/>	_____

## Financial Data

	Completed	N/A	<u>PG. Referenced</u>
Provide applicants 5-10 year capital plan if available.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Include audited O&M costs and revenues for the last 3 fiscal years	<input type="checkbox"/>	<input type="checkbox"/>	_____
Provide breakdown of water and sewer financials; combined financials cannot be used.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Conversion on water usage must be based on ERU or EDU – users must be broken out into residential vs. commercial	<input type="checkbox"/>	<input type="checkbox"/>	_____
Current rate schedule and any anticipated rate schedule adjustments for all tiers of service. Include connection charges and policy on late payments, discontinuation and restoration of service.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Water usage by category – residential vs. commercial	<input type="checkbox"/>	<input type="checkbox"/>	_____
All information on all outstanding debt must be included; to whom owed, original amount owed, current balance, terms, interest rate, annual installment, due date, required reserve accounts.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Short-Lived Asset Replacement schedule; to include 1-15 year items Broken out as 1-5 year, 5-10 year, and 10-15 year life cycle.	<input type="checkbox"/>	<input type="checkbox"/>	_____

## Condition of Existing Facilities (Water Projects)

All Preliminary Engineering Reports for Water and Wastewater projects must contain the following.

	<u>Completed</u>	<u>N/A</u>	<u>Pg. Referenced</u>
The Number and type of maintenance and repairs undertaken, backlogged, and/or forecast to keep the present facilities operating at required capacity.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Circuit Rider reports must be included when referenced in PER.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Supply – Rough evaluation of current water quality, aquifer condition, well condition, capacity, reliability and electrical and mechanical components of the water supply. This information may be available from Circuit Riders and Local Operators. <i>(Intended to be a rough survey to determine if further investigation is required.) A copy of the most recent water quality analysis and consumer confidence report must be included.</i>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Treatment – Evaluate existing condition and effectiveness of treatment system.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Distribution –If improvements are recommended to the distribution system, evaluate the condition of the existing system - a hydraulic model may be required – See Hydraulic Model requirements in this attachment. Verify all services are metered, if not metered must be included as cost in the PER to install meters.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Pump Stations – Evaluate the condition of pump station(s). Specifically evaluate the existing condition of the electrical, mechanical and control systems. In addition, analyze existing head and flow conditions against pump curve. <i>(Intended to be a rough survey to determine if further investigation is required.)</i>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Evaluate system vulnerability to power outages and make recommendations concerning back-up power.	<input type="checkbox"/>	<input type="checkbox"/>	_____
If water usage exceeds 200 gdppc, provide rationale for high water usage.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Provide one page schematic of supply, pumping, and storage system complete with pumping elevations and rates, well head elevations, and storage capacities and elevations	<input type="checkbox"/>	<input type="checkbox"/>	_____
Include map showing boundary lines, proposed system improvements, existing system, wells, and tanks locations. Include crossings of major roads, highways, watercourses, railroads, etc.	<input type="checkbox"/>	<input type="checkbox"/>	_____

## Water Supply

Completed    N/A    Pg. Referenced

Detail all changes which may impact water rights. If additional water rights are required, provide detailed discussion of alternative sources of supply. In addition, if additional water rights/wells are required, a contract must be secured from the Owner of those water rights defining the terms under which those water rights may be purchased. (Note that contracts must have option to execute for at least two years)

\_\_\_\_\_

### Water Source Type – Must Be Completed

- † Purchase Contract
- † Off-Stream Reservoir
- † Wells
- † Lake Intake
- † Spring
- † River Intake

### Water Supply Quality:

## Reservoirs and Storage Tanks

All Preliminary Engineering Reports for Water projects must contain the following information when new reservoirs/tanks are proposed; or when tank/reservoir renovation or modification is proposed.

	<u>Completed</u>	<u>N/A</u>	<u>Pg. Referenced</u>
Provide sizing analysis based on combined volume of operating, emergency reserve, and fire suppression storage.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Statutory deficiencies must be based on NAC 445A.6674* for <u>existing</u> water systems if the public water system has operated for more than 5 years.	<input type="checkbox"/>	<input type="checkbox"/>	_____
If tank coating or replacement recommended, please provide inspection report complete with photographs.	<input type="checkbox"/>	<input type="checkbox"/>	_____
If new storage tank location is being proposed, provide title search assessment of property ownership of proposed site.	<input type="checkbox"/>	<input type="checkbox"/>	_____

## Transmission And Distribution

PER's which recommend changes/expansions/improvements to the transmission/distribution must include the following:

	<u>Completed</u>	<u>N/A</u>	<u>Pg. Referenced</u>
<p>System Analysis documenting the availability of adequate source and storage to serve the proposed service. Including a hydraulic analysis for the proposed project if greater than 6" diameter looped system, or 8" straight pipe. See Hydraulic Model requirements attached</p>	<input type="checkbox"/>	<input type="checkbox"/>	_____
<p>Provide water distribution map showing location of water lines, pipe sizes, type of pipe, pressure zones.</p>	<input type="checkbox"/>	<input type="checkbox"/>	_____

### **Water Distribution Type – Must Be Completed**

- † Full Fire Flow
- † Partial Fire Flow
- † Demand Flow Only
- † Average Flow
- † Cluster
- † Individual

## Water Treatment Systems

	<u>Completed</u>	<u>N/A</u>	<u>Pg. Referenced</u>
Include back-up documentation from State BHPS, NDEP, Discharge Permits, Water Quality Reports, etc.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Include O & M costs for waste handling and waste disposal costs.	<input type="checkbox"/>	<input type="checkbox"/>	_____

### **Water Treatment Type – Must Be Completed**

- |  |  |
|--|--|
| <ul style="list-style-type: none"> <li>† Aeration</li> <li>† Filtration</li> <li>† Softening</li> <li>† Removal of Inorganics</li> <li>† Coagulation</li> <li>† Disinfection</li> <li>† Iron/Manganese</li> <li>† Reverse Osmosis</li> </ul> | <ul style="list-style-type: none"> <li>† Clarification</li> <li>† Taste/Order Control</li> <li>† Trace Organics</li> <li>† Electro dialysis</li> </ul> |
|--|--|

## Hydraulic Water Modeling Requirements

If proposed pipe is larger than 6”in diameter for a looped system, or 8”in diameter for a straight pipe then include the following:

Completed      N/A      Pg. Referenced

           \_\_\_\_\_

Provide Calibrated Hydraulic Water Model per table below. The calibrated model shall then be utilized to model the proposed improvements and all pressure zones impacted by proposed improvements.

### **Minimum Criteria for Planning Level Hydraulic Network Modeling**

Type of Time Simulation	Number of Pressure Readings	Accuracy of Pressure Readings	Number of Flow Readings	Accuracy of Flow Readings
Steady-State or EPS	10% of Nodes on Larger Diameter Pipes	+/- 5 Psi for 100% of Readings	1% of Pipes	+/- 10%

## Condition of Existing Facilities (Wastewater Projects)

All Preliminary Engineering Reports for Water and Wastewater projects must contain the following.

	<u>Completed</u>	<u>N/A</u>	<u>Pg. Referenced</u>
The Number and type of maintenance and repairs undertaken, backlogged, and/or forecast to keep the present facilities operating at required capacity.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Circuit Rider reports must be included when referenced in PER.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Collection System – Describe age, condition, and materials of sewer collection system. For projects recommending replacement or renovation of collection system, evidence must be provided via inspection reports, video survey, or other documented means.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Pump Stations – Evaluate the condition of pump station(s). Specifically evaluate the existing condition of the electrical, mechanical and control systems. In addition, analyze existing head and flow conditions against pump curve. <i>(Intended to be a rough survey to determine if further investigation is required.)</i>	<input type="checkbox"/>	<input type="checkbox"/>	_____
Compare wastewater inflows with water usage and explain any discrepancies	<input type="checkbox"/>	<input type="checkbox"/>	_____
Provide one page schematic of pumping and treatment complete with pumping elevations and rates, discharge elevations, and plant inflow elevations, and existing pipe slopes and elevations.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Include map showing boundary lines, proposed system improvements, Existing system, treatment plant, manholes and crossings (per water)	<input type="checkbox"/>	<input type="checkbox"/>	_____

## Wastewater Collection Improvements

	<u>Completed</u>	<u>N/A</u>	<u>Pg. Referenced</u>
Provide detailed hydraulic calculations for sewer lines in excess of 8” in Diameter.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Investigate slip lining and other trenchless pipe renovation technology as alternative.	<input type="checkbox"/>	<input type="checkbox"/>	_____

### **Wastewater Collection Type – Must Be Completed**

- † Conventional Gravity
- † Effluent Pumps
- † Small Diameter Gravity
- † Vacuum
- † Hauling

## Wastewater Treatment/Disposal

If improvement to the wastewater treatment/disposal are recommended, address the following issues.

	<u>Completed</u>	<u>N/A</u>	<u>Pg. Referenced</u>
Provide back-up documentation from Sate Health, NDEP, or State Engineer (SWDA, CWA, Discharge Permits/violations, Test Well	<input type="checkbox"/>	<input type="checkbox"/>	_____
Monitoring Reports, Water Quality Reports.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Investigate as alternatives, pressure sewer, vacuum sewer, small diameter gravity sewer, STEP.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Analyze Infiltration and Inflow.	<input type="checkbox"/>	<input type="checkbox"/>	_____
Address agricultural and other reuse, and constructed wetlands where applicable.	<input type="checkbox"/>	<input type="checkbox"/>	_____

### **Wastewater Treatment Type – must be completed**

- |                       |                           |                                   |
|-----------------------|---------------------------|-----------------------------------|
| ↑ Flow Equalization   | ↑ Aerated Lagoons         | ↑ Sedimentation                   |
| ↑ Trickling Filters   | ↑ Anaerobic Lagoons       | ↑ Rotating Biological Contractors |
| ↑ Packed Bed Reactors | ↑ Activated Sludge        | ↑ Stabilization Ponds             |
| ↑ Micro screening     | ↑ Nitrogen Removal        | ↑ Phosphorus Removal              |
| ↑ Chlorination        | ↑ Disinfection with Ozone | ↑ Dechlorization                  |
| ↑ Septic Tanks        | ↑ Ultraviolet             | ↑ Oxidation Ditch                 |

### **Wastewater Discharge Type – must be completed**

- |                         |                        |                       |
|-------------------------|------------------------|-----------------------|
| ↑ Surface Irrigation    | ↑ Overland Flow        | ↑ Rapid Infiltration  |
| ↑ Natural Wetlands      | ↑ Constructed Wetlands | ↑ Drainfields         |
| ↑ Controlled Discharged | ↑ Stream               | ↑ Spray Irrigation    |
| ↑ Lake                  | ↑ Ocean Outlet         | ↑ Deep Well Injection |

