CITY OF DOVER

Water System Facility Plan

October 2013

Tate Engineering, Inc.
1103 N. 4th Street
Coeur d'Alene, Idaho 83814
(208) 676-8708
rtate@tate-eng.com

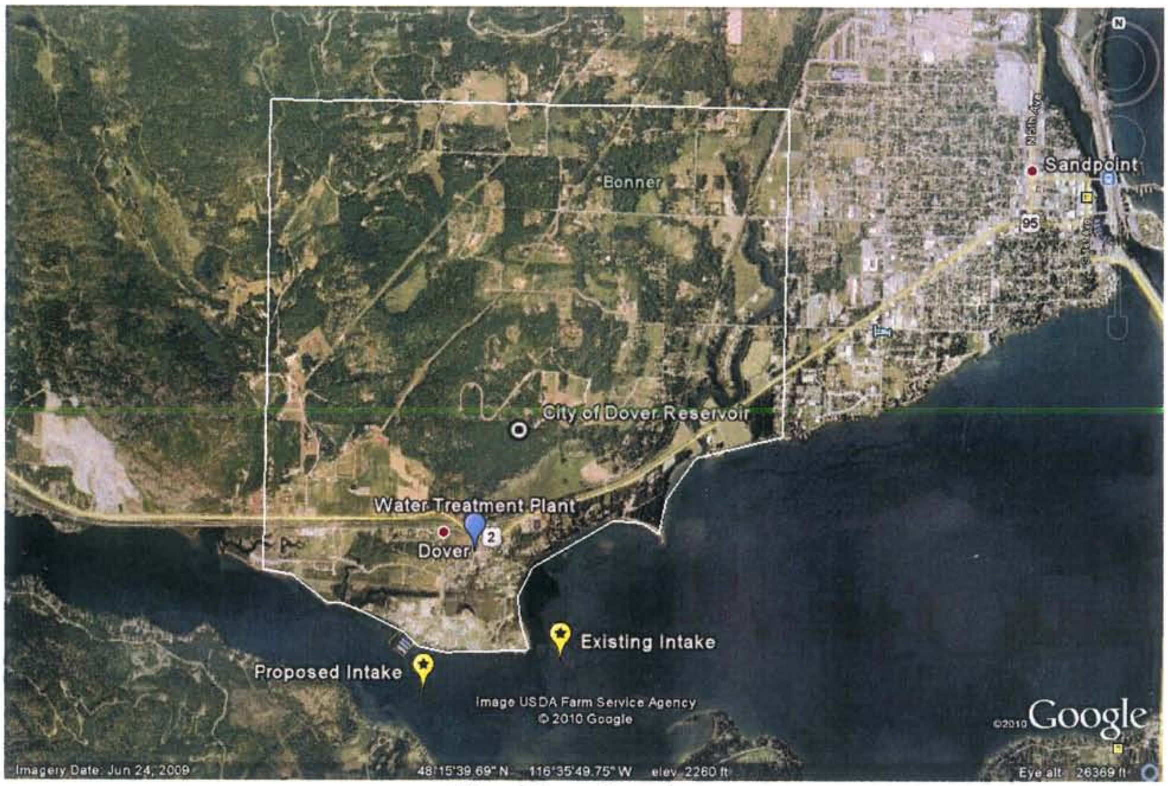
Robert M. Tate, P.E.

PROFESSIONAL ENGINEER
REGISTERED
6896
10/25/13
STATE OF IDAHO
ROBERT M. TATE

Table of Contents

Executive Summary

This Water System Facility Plan is meant to be used as guidance during future projects as a result of growth and will detail construction parameters for the addition of a new slow sand filtration facility, raw water intake upgrade, raw water intake, and distribution system improvements for the City of Dover water system. Although James A. Sewell & Associates submitted a Domestic Water System Facilities Plan in June of 2007, the plan was never approved by the Idaho Department of Environmental Quality. This plan includes specifications for a raw water intake upgrade of the existing intake (future) and new raw water intake at the Dover Bay Marina (Present).



City of Dover Boundary

Introduction

The City has taken responsibility for meeting future needs of its constituents by proactively applying for grant and loan monies in an effort to construct needed water system components. In the past, the City has always maintained a good working relationship with its residents and managed to not only upgrade the system when needed, but provide clean potable water at a very reasonable rate. To achieve needed upgrades for the system, the City will need to work with such agencies as the Department of Lands, the US Fish & Game, the Department of Water Resources, the Department of Environmental Quality and Urban Renewal.

Sanitary Restrictions

Sanitary restrictions for the remaining 460 lots in the Dover Bay development were implemented by IDEQ in an effort to minimize effects to the water and wastewater systems. The restrictions were added to minimize effects caused by sudden growth and to assure that existing customers had some protection from rapid development. Restrictions for the wastewater portion were released in 2010, however water system restrictions are still in place and holding back the potential growth of the City.

Table: 1 Actual Usage Comparison

2011	Connections	Projected Max Use/ER	Projected 5 Day Max	Actual Max 5 Day Use	Treatment Capacity	Percentage of Capacity Used
City of Dover	95	1,000	475,000	6-Aug		
Dover Bay	87	400	174,000	10-Aug		
Total	182		649,000	655,000	1,440,000	45%
DBD inactive	60	400	120,000			
Total	242		769,000		1,440,000	53%

The above table indicates actual values recorded by the City of Dover in 2011, providing accurate usage information. This table is a summary of peak use to be compared to design values.

Design values are based on 1000 gallons per day for the City of Dover and 400 gallons per day for the Dover Bay Development, and have been derived from actual usage, as shown in Table 1 above. Design flows are based on peak 5 day actual flows averaged over a 365 day calendar year. These flows have been based on guidelines set forth in the Washington State Design Manual.

The future projects listed in this report are to be funded by connection fees and Urban Renewal monies that will be generated from home construction in the Dover Bay Development, however as long as the sanitary restrictions are in place, construction cannot take place, therefore preventing Urban Renewal growth and funding.

The lifting of the sanitary restrictions for the remaining lots in the Dover Bay Development is an important factor in completing future projects for the City of Dover. This report will show that the existing water system can serve up to 482 additional connections in Dover Bay without impacting the existing users. By lifting sanitary restrictions and review of the system through the required sanitary survey requirements, the IDEQ can be assured that water system infrastructure is handling peak water usage periods. Therefore it is recommended that he Sanitary Restrictions be lifted in which will allow continued growth that can provide the funding necessary for the fulfillment of the plan.

Future Projects

Future projects for the City of Dover include the following:

1. Constructing new raw water intake by means of Dover Bay Developments irrigation vault
2. Control valve between Cedar Ridge and main reservoir
3. Transmission line improvements from reservoir to Highway 2
4. Treatment Plant Upgrade
5. Intake Reconstruction or Irrigation System Tie-in

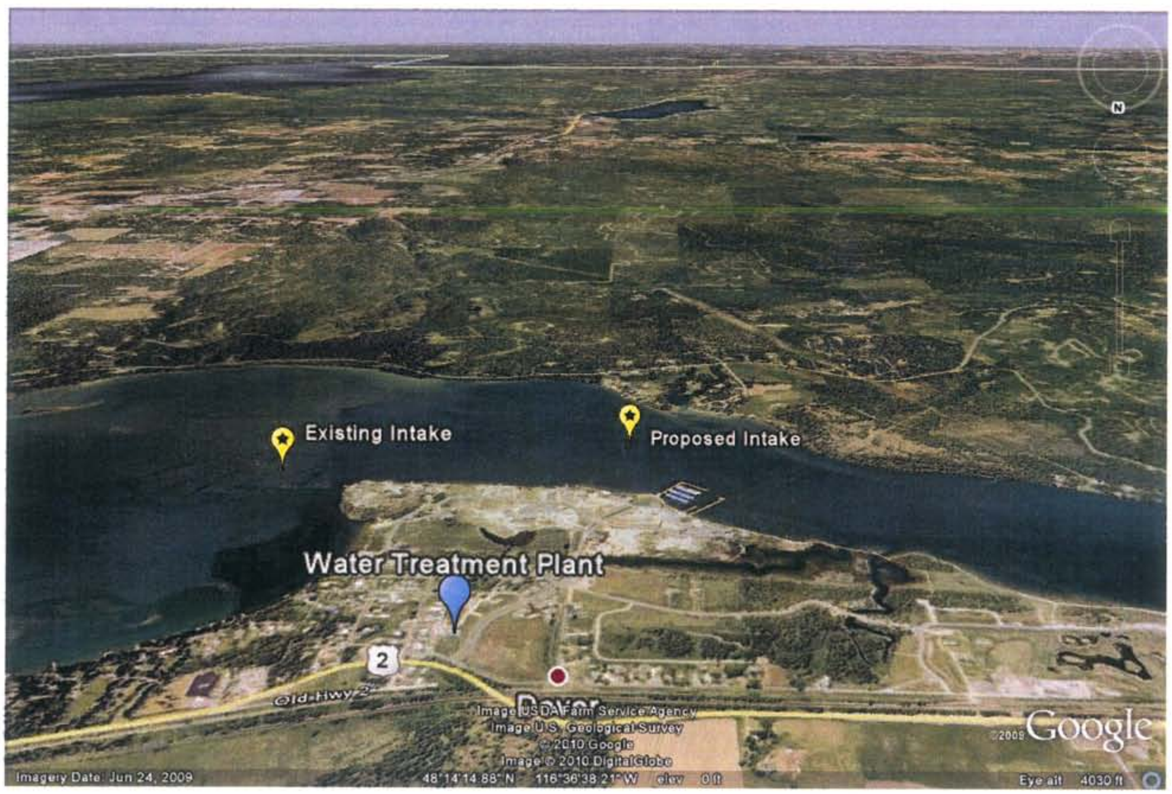
These projects are vital for the City to continue to grow and provide quality drinking water with adequate service.

Existing City of Dover Slow Sand Filter Facility

Existing Conditions

The City of Dover was incorporated in 1989 and currently serves 95 water system users within its original boundaries, including 5 users in the Cedar Ridge service area. The Dover Bay Development, a portion of the City of Dover, serves an additional 87 users for a total of 182 water system users. There are approximately 60 users connected to the system in Dover Bay that are not active at this time.

The City of Dover takes in an area of just over four (4) square miles, however does not serve water nor treat wastewater to this entire area. In fact, there is more property within the City of Dover that is not served by the City, than property that is. The average elevation of the lower more populated part of the City is approximately 2,076 feet above sea level, with a 100 year flood plain elevation of 2,069 feet. The City is located within the Pend Oreille Watershed and also the Northern Rocky Mountains Intermontane Basins Aquifer System. The undeveloped lands in the City range from flat open fields to heavily treed mountains.



Existing water source facilities include a slow sand filtration building which filters raw water from the Pend Oreille River. Raw water reaches the treatment facility after being pumped through a dedicated raw water line connected to a raw water intake and delivery system. The existing slow sand filtration facility filters 50 gallons per minute per bed from four sand filtration beds for a maximum of 200 gallons per minute. A dedicated treatment line directs treated water to a baffled water treatment reservoir. Distribution lines then deliver the water to individual connections and fire hydrants throughout the distribution system. The current treatment process consists of twelve and a half percent (12.5 %) hypochlorite solution injected by means of an LMI chemical injection pump. Overall, the system is in really good condition, with respect to a few upgrades to help with future growth.

The Dover Bay Development has constructed, as part of its infrastructure, an irrigation water intake system which diverts water from the Pend Oreille River to all of its existing and future lots. This separate irrigation system will no doubt help relieve water system demand issues for the City of Dover.

Storage for the City of Dover has been supplemented by infrastructure occurring from the Dover Bay Development. The total storage capacity is 353,824 gallons. The Cedar Ridge service area includes a 47,000 gallon reservoir that currently serves 5 residences. Water is pumped to the Cedar Ridge tank by booster pumps. Because the population base rests far below the reservoir, the City has no pressure zone problems, only low fire flow areas due to small line sizes.

The City of Dover residents' water usage demand is based on the Washington State Design Manual. Residents of the Dover Bay Development area will be calculated with the design criteria of 400 gallons per day because irrigation is already being supplied.

The City has adopted a cross connection control program as an ordinance and enforces it by means of water termination for non compliance. This ordinance can be found in the Appendix.

The City of Dover expended approximately $104,000 for water system expenses in 2009, or an average of $8,600 per month. The total City revenue for water in 2009 was $121,000 or an average of $10,000 per month. The City needs to recoup this amount plus additional monies each month if they are going to continue to meet monthly water system demands and plan for future upgrades.

Water Use Data

The City of Dover is asking IDEQ to release sanitary restrictions on an additional 482 future water connections in the Dover Bay development. Without release of the sanitary restrictions, additional funds cannot be collected from new construction, therefore preventing connection fees and Urban Renewal from funding proposed system upgrades. This facility plan and all system upgrades are being designed and will be approved and constructed per design criteria of 1000 gallons per day per unit for the City of Dover, and 400 gallons per day for the Dover Bay Development.

Table: 2 Existing/Future Daily Production and Demand

Supply/ One Filter offline	288,000	GPD
Demand – 95 @ 1000 GPD	95,000	GPD
482 @ 400 GPD	192,800	GPD
Total	**287,800**	**GPD**
Difference	**200**	**GPD**

Based on the above table, the City of Dover is currently producing enough finished water to meet the daily demand of its consumers at 550 total lots. Additional future system upgrades will increase potential for connections beyond the 550. A schedule for improvements of future needs has been proposed and is located under the Financial Plan later in this report. Future plant upgrades will be designed based on standard design values of 1000 GPD per connection for normal lots and 400 GPD for lots with separate irrigation.

Table: 3 2011 Water Production Data

January	964,000
February	988,000
March	1,116,000
April	1,055,000
May	1,332,000
June	1,460,000
July	2,011,000
August	2,600,000
September	2,017,000
October	1,249,000
November	993,000
December	987,000
Total	16,772,000

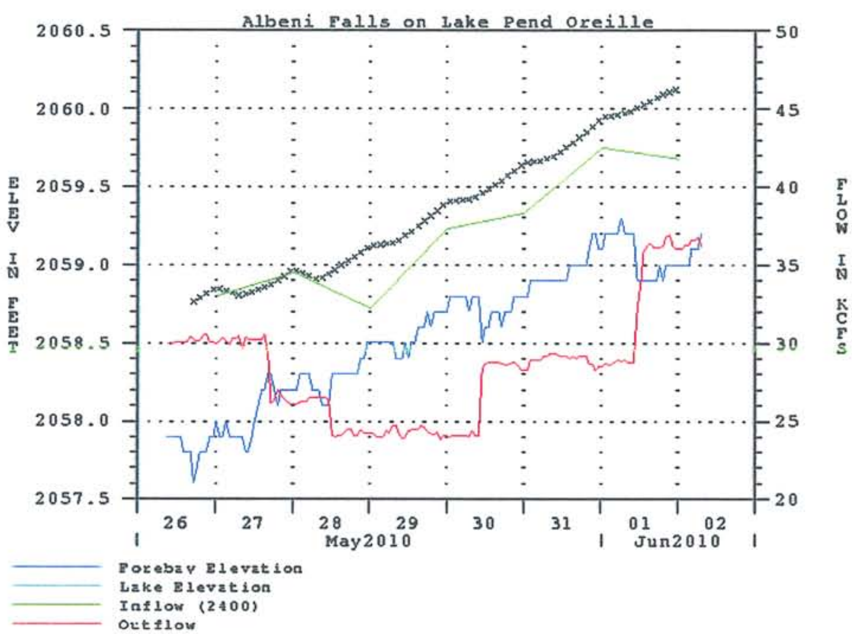
Environmental Conditions

Existing environmental conditions in the planning area and proximity to the proposed project include the following:

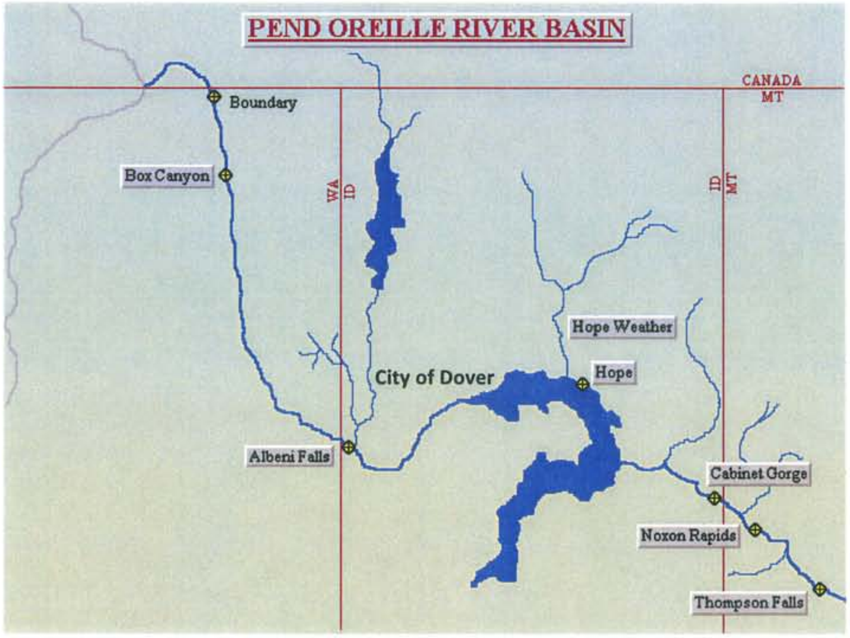
1. Physiography, topography, geology and soils
    a. The surrounding area of the project is flat. The City does however have quite a bit of area that is mountainous, especially in the Cedar Ridge and Syringa areas. Soils are relatively flat lacustrine sediment that is composed of glacially generated silt and clay sediments that have very low permeability.
2. Surface and groundwater hydrology
    a. Surface water is that of the Pend Oreille River. A study was conducted by the Washington State Department of Ecology to address water quality concerns of the Pend Oreille River between Albeni Falls and Box Canyon Dams. Five stations were sampled every three weeks between July and November 1988. Water quality was generally good

and well below the threshold of eutrophication conditions. Phytoplankton species were typical of oligotrophic to mesotrophic waters. Periphyton concentrations were well below nuisance levels for aesthetic impairment. Macrophytes were responsible for water quality violations for pH and total dissolved gases during the peak of the growing season. There was no significant difference between sample stations for nutrients, suggesting macrophyte occurrence and sediments do not elevate instream nutrient loads. Brackett Creek, Skookum Creek, and South Fork Lost Creek exceeded Class A water quality standards for fecal coliform.

b. Uses for the Pend Oreille River include but are not limited to Fishing, recreation, irrigation and domestic water supply. The below chart shows recent flows of the river at the Albeni Falls dam.



Flows from Recent Months at Albeni Falls Dam



Albeni Falls Dam Location

3. Housing, Industrial, and Commercial Development
   a. Housing growth in the City has been sporadic. Existing boundaries prior to the Dover Bay Development were not accustomed to large growth movements. With the Dover Bay development, came rapid housing growth and unneeded growing pains. The Dover Bay development alone has more than tripled the original size of the City.
   b. Commercial buildings in the sense of condos and summer rentals are quite numerous in the Dover Bay development; however industrial businesses are almost nonexistent due to the close proximity of Sandpoint.
4. Utility Use
   a. The standard utility use of the City is as follows:
      i. Water
      ii. Sewer
      iii. Electricity
      iv. Natural Gas
      v. Phone (Land lines and high speed internet)
      vi. Phone (Cellular)
      vii. Cable T.V.
      viii. Dish T.V.
5. Flood Plains & Wetlands
   a. Wetlands along the Pend Oreille River and its tributaries include:
      i. forested wetland

ii. scrub-shrub wetland
iii. emergent wetland
iv. wet meadow or floodplain grassland
v. open water
vi. upland forest
vii. riparian deciduous forest

6. The project plan area does include wetlands and a Wetland Delineation Plan has been created and approved by the Corps of Engineers. The plan was created by Sewell & Associates and will be used in conjunction with this project.
7. Public Health and Water Quality Considerations
   a. Public health will not be affected during the completion of this project. All construction activities will be limited to restricted areas for construction personnel only.
   b. Water quality considerations are as follows:
      i. Protection of source water, Pend Oreille River.
      ii. Protection of existing water mains during construction of new facility.
      iii. Supervision of construction practices such as:
         1. Chlorination of new water mains and facilities,
         2. Flushing of new mains and facilities, and
         3. Bacteriological testing of new water mains and facilities.
8. Proximity to a Sole Source Aquifer
   a. The proposed project does not sit over a sole source aquifer.
9. Land Use and Development
   a. The project site is currently zoned appropriately for this nature of facility and has been set aside to do so. Land use will be the same as the existing slow sand filter facility.
10. Precipitation, Temperature and Prevailing Winds
    a. The City of Dover experiences on average, 33.5-inches of rainfall and 71.7-inches of snow annually. Winds are mild with occasional gusts of up to 50 miles per hour. Temperatures drop as low as -10 degrees Fahrenheit in the winter and get as high as 100 degrees Fahrenheit in the summer. Temperature, precipitation and winds will all be factors during the construction of this project.
11. Air Quality and Noise
    a. The average air quality for Dover is considered "Good" and will not be affected by construction procedures during this project.
    b. Noise level and construction work times within the City limits will be mandated by the Cities Ordinance and will depend on the time of year. There are no current noise issues.
12. Energy Production and Consumption
    a. No energy will be produced as a result of this project.
    b. Energy consumption for the finished proposed project is projected at two (2) times that of the existing slow sand filter facility, which varies during different times of the year.
13. Socioeconomic Profile of the Affected Community
    a. Population July 2007, 380

b. Median Resident Age, 45.9
c. Median household income in 2008, $47,459
d. Median house or condo value in 2008, $248,339

14. Maps, Site Plans, Schematics, Tables and Letters
    a. See Appendix

A sanitary Survey was completed by Suzanne Scheidt of the Idaho Department of Environmental Quality in July of 2012 which produced a letter indicating that the system was in substantial compliance. The survey remarked highly on the operation and maintenance efforts completed by the operator and listed some minor items that needed correction to meet full compliance. All of those items have been corrected.

Water quality within the City of Dover is exceptional and they have no pending violations or concerns of water quality being held against them. They have done a remarkable job of staying just ahead of the growth curve while all the while producing clean potable drinking water for their consumers.

Hydraulic Analysis

A hydraulic analysis has been completed for the City of Dover. The process of completing the analysis was to first locate and GPS all existing water lines, facilities, reservoirs, elevations and pumps. The data was entered into our WaterCAD software and then calibrated using existing fire flow data. Once calibrated, different scenarios were run to determine what upgrades have the most positive influence on the City of Dover. Scenario results are detailed later in this report.

Future Conditions

The City of Dover's future hangs in the balance until proposed measures are approved, constructed and put into use. The following topics indicate the suggested forecast of growth and demand for the City.

When forecasting city growth, we did not use population, but rather available ER's. The City of Dover is land locked between the Pend Oreille River, Sandpoint and small homeowner associations. Unless the City is to grow away from the lake and more into the rural confines of Dover, it will not see much growth beyond its present capabilities, however we have set the build out proposed ER total at 1,100. This ER information was derived from both the Sewell & Associates report and data collected from the City on present day connections. The 20 year scope for the City is discussed again later in this report.

Flow Requirements

Before an accurate future flow requirement can be sustained, first there must be a future connection projection. The Dover Bay Development at build out will provide for 600 livable units or ER equivalents. The original City of Dover boundaries and surrounding area are capable of providing for 500 total livable units or ER equivalents, including 10 additional connections in the Cedar Ridge services area. In all, the City of Dover at present could reach 1,100 livable units or ER equivalents without annexation. 1,100 connections have been set as the target for standard design criteria in the City of Dover.

500 units at 1,000 gallons per day equal a total of 500,000 gallons per day

600 units at 400 gallons per day equal a total of 240,000 gallons per day

1,100 units at the above design criteria equal 740,000 gallons per day.

Fire flow for the City will more than likely remain the same due to the fact that Dover is primarily a residential town with limited commercial capabilities. Present fire flow is 2,000 gallons per minute for two (2) hours which is set for both residential and commercial. Present fire flow is 1,000 gallons per minute for two (2) hours in the old part of Dover and 2,000 gallons per minute for two (2) hours in the newer Dover Bay Development. As part of the original conditions, fire flow in the Dover Bay Development portions of the City need to be increased to meet the required demand.

The 5 day peak demand for 2011 was in the month of August where the average ER used 3,600 gallons for the 5 day period, or 720 gallons per day. This is lower than usual due to the separate irrigation system installed and being used within the Dover Bay Development, which takes some of the burden off of the City during the hot summer months. Using the above design criteria will not only allow for peak demand plus extra usage, but allow fire flow while not affecting the systems users.

Land use plans for the area served by the existing and future drinking water facilities are expected to remain the same. The area is primarily residential with extensive summertime tourist use. Commercial and Industrial sites are not likely due to the close proximity of the River and the nearby established town of Sandpoint. The City of Dover is quiet and functions as a tourist attraction due primarily to its beautiful surroundings. Lot sizes and current land use is not inceptive of large commercial buildings.

Hydraulic Analysis

A hydraulic analysis was completed that consisted of running two different scenarios for the upgrading of the transmission line from the reservoir down to the system. The advantage of upgrading the transmission line is that by increasing the size or overall volume, fire flow can be brought to standard flows. It is important to remember however, that old Dover was approved and constructed under lower fire flow requirements which resulted in mostly 6-inch mainlines. 6-inch mainlines are not conducive to 2,000 gallon per minute fire flows. The intention of increasing the transmission main and fire flows is for the Dover Bay Development and future new additions within the City of Dover.

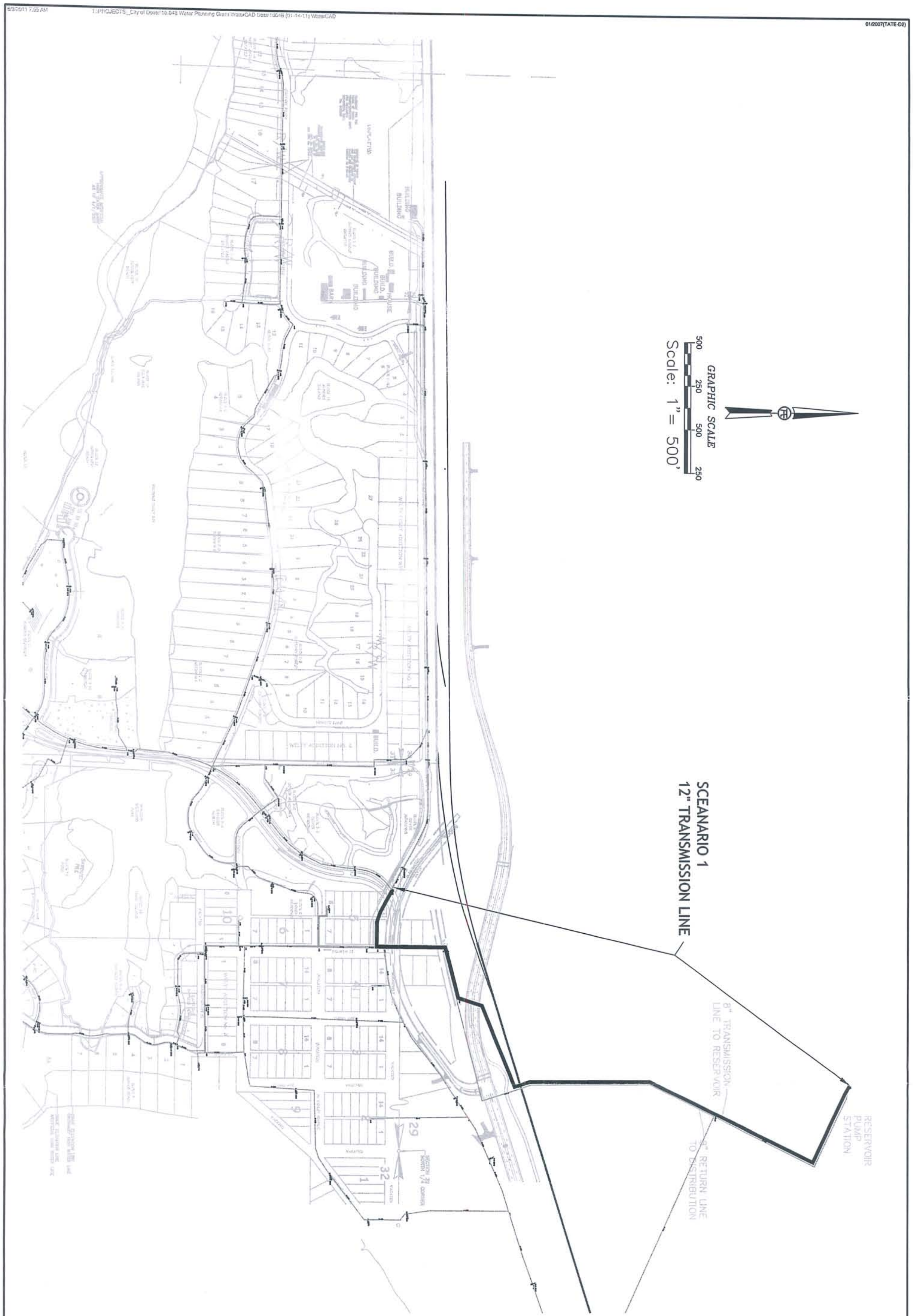
Table: 4 Scenario Results Overview

	Existing						
Label	Fire Flow	Scenario 1	Difference		Scenario 2	Difference	
H-1 (2011)	560	644	84	15.00%	590	30	5.36%
H-2 (2011)	599	704	105	17.53%	636	37	6.18%
H-3 (2011)	678	842	164	24.19%	734	56	8.26%
H-4 (2011)	760	1,010	250	32.89%	841	81	10.66%
H-5 (2011)	894	1,384	490	54.81%	1,032	138	15.44%
H-6 (2011)	939	1,997	1058	112.67%	1,226	287	30.56%
H-7 (20110	943	1,957	1014	107.53%	1,237	294	31.18%
H-8 (2011)	947	2,224	1277	134.85%	1,245	298	31.47%
H-12 (2011)	931	3,095	2164	232.44%	1,210	279	29.97%
H-13 (2011)	1,036	3,360	2324	224.32%	1,336	300	28.96%
H-15 (2011)	943	2,857	1914	202.97%	1,244	301	31.92%
H-16 (2011)	934	2,800	1866	199.79%	1,227	293	31.37%
H-17 (2011)	932	2,529	1597	171.35%	1,224	292	31.33%
H-18 (2011)	941	2,585	1644	174.71%	1,246	305	32.41%
H-19 (2011)	956	2,310	1354	141.63%	1,292	336	35.15%
H-20 (2011)	943	2,739	1796	190.46%	1,250	307	32.56%
H-21 (2011)	950	1,560	610	64.21%	1,266	316	33.26%
H-23 (2011)	957	1,758	801	83.70%	1,332	375	39.18%
H-24 (2011)	939	1,525	586	62.41%	1,360	421	44.83%
H-25 (2011)	801	1,111	310	38.70%	1,492	691	86.27%
H-26 (2011)	715	919	204	28.53%	1,642	927	129.65%
H-27 (2011)	634	769	135	21.29%	1,092	458	72.24%
H-28 (2011)	806	1,070	264	32.75%	895	89	11.04%
H-29 (2011)	818	1,099	281	34.35%	911	93	11.37%
H-30 (2011)	829	1,130	301	36.31%	928	99	11.94%
H-33 (2011)	831	1,155	324	38.99%	935	104	12.52%
H-34 (2011)	845	1,183	338	40.00%	953	108	12.78%

H-35 (2011)	852	1,204	352	41.31%	964	112	13.15%
H-36 (2011)	852	1,213	361	42.37%	966	114	13.38%
H-37 (2011)	860	1,237	377	43.84%	978	118	13.72%
H-38 (2011)	865	1,253	388	44.86%	985	120	13.87%
H-39 (2011)	865	1,258	393	45.43%	986	121	13.99%
H-40 (2011)	945	1,529	584	61.80%	1,109	164	17.35%
H-41 (2011)	927	3,500	2573	277.56%	1,200	273	29.45%
H-42 (2011)	924	3,500	2576	278.79%	1,194	270	29.22%
H-43 (2011)	949	2,336	1387	146.15%	1,248	299	31.51%
H-44 (2011)	949	2,198	1249	131.61%	1,249	300	31.61%
H-46 (2011)	920	3,255	2335	253.80%	1,186	266	28.91%
H-47 (2011)	917	3,169	2252	245.58%	1,183	266	29.01%
H-48 (2011)	910	2,862	1952	214.51%	1,169	259	28.46%
H-49 (2011)	916	3,120	2204	240.61%	1,180	264	28.82%
H-50 (2011)	914	3,078	2164	236.76%	1,177	263	28.77%
H-60 (2011)	943	1,497	554	58.75%	1,315	372	39.45%
H-61 (2011)	925	3,500	2575	278.38%	1,196	271	29.30%
H-62 (2011)	910	2,862	1952	214.51%	1,169	259	28.46%
H-63 (2011)	910	2,865	1955	214.84%	1,169	259	28.46%
H-64 (2011)	907	2,791	1884	207.72%	1,165	258	28.45%
H-65 (2011)	907	2,736	1829	201.65%	1,162	255	28.11%
H-66 (2011)	903	2,670	1767	195.68%	1,156	253	28.02%
H-67 (2011)	899	2,593	1694	188.43%	1,149	250	27.81%
H-68 (2011)	906	2,731	1825	201.43%	1,162	256	28.26%
H-69 (2011)	906	2,723	1817	200.55%	1,163	257	28.37%
H-70 (2011)	906	2,709	1803	199.01%	1,162	256	28.26%
H-71 (2011)	896	2,525	1629	181.81%	1,142	246	27.46%
H-72 (2011)	912	2,846	1934	212.06%	1,171	259	28.40%

H-73 (2011)	915	3,026	2111	230.71%	1,176	261	28.52%
H-74 (2011)	911	2,353	1442	158.29%	1,169	258	28.32%
H-75 (2011)	911	1,634	723	79.36%	1,139	228	25.03%
H-76 (2011)	911	1,874	963	105.71%	1,169	258	28.32%
H-77 (2011)	910	2,051	1141	125.38%	1,169	259	28.46%
H-78 (2011)	949	2,285	1336	140.78%	1,249	300	31.61%
H-79 (2011)	950	2,428	1478	155.58%	1,250	300	31.58%
H-80 (2011)	950	2,587	1637	172.32%	1,251	301	31.68%
H-81 (2011)	926	3,069	2143	231.43%	1,210	284	30.67%
H-82 (2011)	920	2,951	2031	220.76%	1,194	274	29.78%
H-83 (2011)	921	2,734	1813	196.85%	1,194	273	29.64%
H-84 (2011)	931	2,932	2001	214.93%	1,219	288	30.93%
H-85 (2011)	587	687	100	17.04%	623	36	6.13%
H-86 (2011)	947	1,862	915	96.62%	1,285	338	35.69%
H-87 (2011)	914	3,100	2186	239.17%	1,178	264	28.88%
H-88 (2011)	951	2,751	1800	189.27%	1,253	302	31.76%
H-100	581	678	97	16.70%	616	35	6.02%
H-102	841	1,157	316	37.57%	944	103	12.25%
H-103	965	3,441	2476	256.58%	1,268	303	31.40%
H-104	844	1,164	320	37.91%	948	104	12.32%
H-105	943	1,507	564	59.81%	1,280	337	35.74%
H-106	831	1,141	310	37.30%	932	101	12.15%
H-107	942	1,953	1011	107.32%	1,234	292	31.00%
H-108	832	1,152	320	38.46%	936	104	12.50%
H-109	915	3,117	2202	240.66%	1,179	264	28.85%
H-110	912	2,929	2017	221.16%	1,173	261	28.62%
H-111	823	2,125	1302	158.20%	1,039	216	26.25%
H-112	531	1,266	735	138.42%	662	131	24.67%
H-113	919	2,888	1969	214.25%	1,186	267	29.05%

01/2007(TATE-D2)



SHEET 1 OF 2

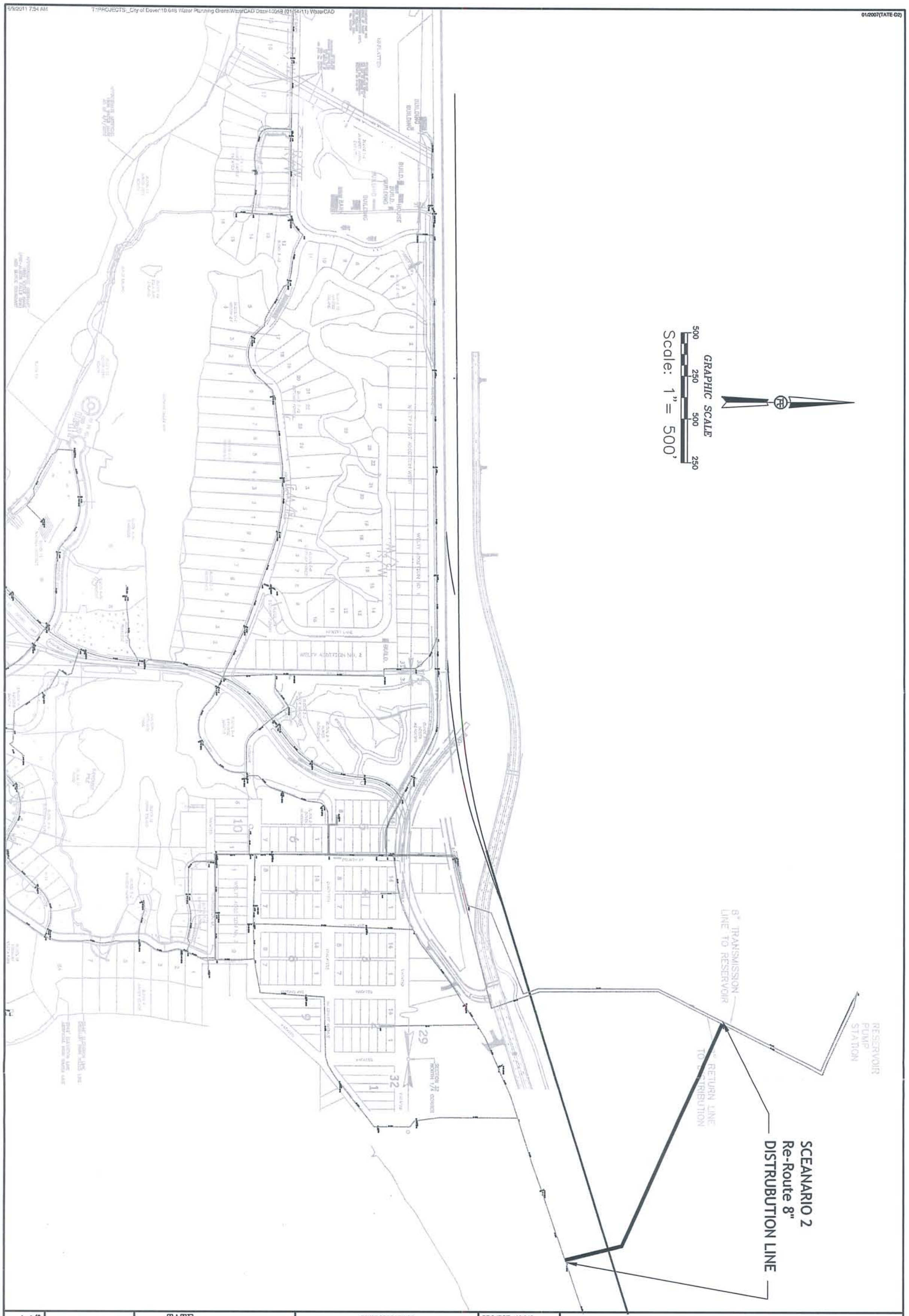
TATE ENGINEERING
1103 N. 4th Street
Coeur d' Alene
Idaho, 83814
(208)676-8708
FAX: (208)667-2129
E-MAIL: rtate@tate-eng.com

REVISION

NO.	DESCRIPTION	BY	APR	DATE

PROJECT: 10.048
DRAWING: 10048 (21-14-11) WATERCAD
DESIGN BY: RMT
DRAWN BY: DPS
CHK. BY: BLC
LAST EDIT DATE: 4/19/11

City of Dover, Idaho
WaterCAD Information
Sceanario 1 - 12" Transmission Line



SHEET 2 OF 2

TATE ENGINEERING
1103 N. 4th Street
Coeur d' Alene
Idaho, 83814
(208)676-8708
FAX: (208)667-2129
E-MAIL: rtate@tate-eng.com

REVISION

NO.	DESCRIPTION	BY	APR	DATE

PROJECT: 10.048
DRAWING: 10048 (01-14-11) WATERCAD
DESIGN BY: RMT
DRAWN BY: DPS
CHK. BY: BLC
LAST EDIT DATE: 4/19/11

City of Dover, Idaho
WaterCAD Information
Sceanario 2 - Re-Route 8" Distribution Line

Scenario 1

Scenario 1 included replacing the existing 8-inch transmission line with a 12-inch. The new line would be constructed next to the old and follow the same path tying in to a new 12-inch line constructed as part of the Dover Bay Development on Railroad Avenue.

Scenario 2

Scenario 2 included tying into the existing 8-inch downstream of the reservoir and running a new 8-inch line northeast to tie in at the eastern most part of the system. A 12-inch line did not work in this scenario due to the existing line on the eastern portion be only 8-inch. The advantage of this scenario was to route the line closer to Syringa Heights for future service.

Conclusion

It is obvious from the scenario results that scenario 1 which includes a 12-inch transmission line is the best option for the City. Replacement of the transmission line increases fire flows across the entire City and brings everything within the Dover Bay Development up past the 2,000 gpm required flow. Flow increases from the 12-inch transmission line average 1,345 gallons per minute or 146.12%. This is a significant addition of flow and would allow the City and Dover Bay Development to grow with confidence that fire flows and daily demand can be met.

Reservoir Sizing

The State of Idaho provides design guidelines for sizing reservoirs. Previously, the state allowed the standby storage and the fire suppression storage to include one another whichever was larger. That is no longer allowed, which affects the reservoir sizing criteria. The City is currently served by two reservoirs. The State of Idaho allows for the standby storage to on an 8 hour of the average day demand useage, if no standby power is provided.

The main reservoir has a total storage volume of 353,824 gallons and another reservoir that serves the upper Cedar Ridge zone. This reservoir is 47,000 gallons. There are currently 5 services in the Cedar Ridge zone and their demand is included in the maximum day calculations as it is fed through the main system.

Currently, there are manual valves in place that would allow the operator to use the cedar ridge storage volume back to the main reservoir. Therefore, between the two reservoirs, there is 400,824 gallons.

Table: 5 Reservoir Sizing Criteria

Max Daily Flow	131,000		Aug-11	
	PHD GPM	PHD Day/ERU	PHD GPM/ERU	ADD
Dover	200	1,000	2.11	332
DBD	85	400	0.98	166
Combined	286	1,400	3.09	

OS= Operational Storage
ES= Equalizing Storage
SB= Standby Storage
FSS= Fire Suppression Storage
ADD= 16,772,000.00 Annual Use

Existing Storage	400,824	
Source Supplies/GPM	200	300
Hourly Supply	12,000	

Current Active ERU's	ERU's	PHD	PHD GPM/ERU	OS	ES Required	SB Required	FSS Required	Storage Needed
Dover	95	200.29	2.11	19,657		10,503	240,000	
DBD	87	85.36	0.98	19,657		4,809	240,000	
Combined	182	285.65	3.09	19,657	12,848	15,312	240,000	287,817
Current Connected ERU'	ERU's	PHD	PHD GPM/ERU	OS	ES Required	SB Required	FSS Required	Storage Needed
Dover	95	200.29	2.11	19,657		10,503	240,000	
DBD	160	127.72	0.80	19,657		8,844	240,000	
Combined	255	328.01	2.91	19,657	19,202	19,347	240,000	298,206
Additional 50 ERU's	ERU's			OS	ES Required	SB Required	FSS Required	Storage Needed
Dover	98	205.50	2.10	19,657		10,834	240,000	
DBD	210	155.50	0.74	19,657		11,608	240,000	
Combined	308	361.00	2.84	19,657	24,150	22,443	240,000	306,250
150 Additional ERU's	ERU's			OS	ES Required	SB Required	FSS Required	Storage Needed
Dover	120	236.75	1.97	19,657		13,267	240,000	
DBD	360	232.72	0.65	19,657		19,900	240,000	
Combined	480	469.47	2.62	19,657	40,421	33,167	240,000	333,245
	ERU's			OS	ES Required	SB Required	FSS Required	Storage Needed
Current Reservoir	200	382.58	1.91	19,657		22,111	240000	
	550	324.94	0.59	19,657		30,403	240000	
		707.53	2.50	19,657	46,129	52,514	240,000	358,300
Full Buildout	ERU's			OS	ES Required	SB Required	FSS Required	Storage Needed
Dover	500	903.42	1.81	19,657		55278	240,000	
DBD	600	347.17	0.58	19,657		33167	240,000	
Combined	1,100	1250.58	2.39	19,657	112,588	88,445	240,000	460,689

Development & Initial Screening of Alternatives

Although the City has increased its water storage capacities in an effort to ease demand issues, the need for additional source water is still an issue due existing raw water intake. Constructing a new intake, prior to upgrading the existing intake and then constructing an additional slow sand filter and upgrading the transmission line, will assure future growth to 1,100 units in and around the City of Dover.

To effectively meet the goal of providing enough water to adequately supply the existing and proposed slow sand filter the raw water system must be upgraded. These plans have been submitted and approved to IDEQ and we are ready to start construction.

There is enough storage to serve 236 units developed in Dover and 600 units in Dover Bay. The sytem is limited by treatment capacity to serve 95 units in Dover and 482 in Dover Bay. Additional storage can be accomplished by connecting the Cedar Ridge Reservoir with a PRV to connect into the existing system. This will provide 400,000 gallons of storage. At buildout, an additional 60,000 gallons of storage will need to be provided if standby power is not provided.

The new intake has been designed and proposed to be located at the marina in the Dover Bay Development with funding procured through an IDWR Loan. The existing irrigation vault with existing sleeve and raw water line to the SSF will be put in to use as the first step of upgrading the intake problem.

Additionally the City and Dover Bay has the option to intertie the existing Dover Bay Irrigation System and the new Intake to provide redundancy for the raw water. This has the potential to save the City up to $ 500,000 in improvements to the existing intake system. This would be a future project and revisions to the existing water rights would be required for this improvement. The intertie with the irrigation system is a future project that could replace the improvements to the existing intake.

The existing intake, uses submersible well pumps in 8-inch PVC sleeves resting on the river bed. Due to the following reasons, the intake has become very inefficient and troublesome.

1. The end of the PVC sleeve intake in which the pumps rest is easily covered with mud and silt settling in the river.
2. When the Albeni Falls dam lowers the winter time lake level, the pumps cavitate due to low head over the pump.
3. The pumps are undersized and do not produce enough water to sustain future design flows.

The alternative for these problems are to design and construct a flooded wet well that rests on the shore of the river. The intake line out into the river needs to be deepened and extended out further into the river with a different type of screen that can be supported better on the river bottom. The pumps should be submersible and mounted on slide rails with sealing flanges in the wet well. By installing the pumps in a flooded wet well, the depth of head at low water can be compensated for by simply deepening the wet well and maintaining that the intake line is always below the water surface in low water periods. This type of installation will ease operator duties and allow for quicker maintenance without taking the entire wet well out of service.

Environmental impacts associated with the construction of a new raw water intake could affect source water quality and fish and wildlife habitat if not constructed carefully and correctly. Special precautions and permits will be needed in an effort to reduce these risks. These risks are discussed at greater depth as part of the EID report.

Alternatives for additional finished water are slow sand, membrane filtration, diatomaceous earth, ground water, supply from a different entity and no alternative.

Because the City already uses slow sand as a reliable source and because Sewell & Associates have recommended a membrane filtration facility they will be the two main alternatives researched. Diatomaceous earth is not commonly used in this area and therefore will not be included. Ground water is not an option for the City due to its unreliability in the area and will also not be included.

Project Phasing Plan

The following outline has been developed that outlines the priority and funding source for the City of Dover to meet the ultimate build out needs:

Current Project:

1) Install secondary intake for the City water system. Project has been designed and funding procured. Estimated completion Fall 2013. Estimated cost: $232,500.00

Phase 1 – Project

1) Install automatic valve between Cedar Ridge and main reservoir. Estimated cost $30,000 Based upon historic growth rates, Phase 1 can be completed in 2014. During 2013 it is estimated that 15 additional Dover Bay ERU's will be sold generating $ 120,000 in connection fees.

Phase 2 – Project

1) Construct the Transmission Line between the Reservoir and the City to provide increased fireflows. A portion of this has been constructed under the new Highway bridge. The estimated cost is $ 400,000. Phase 2 could be completed in 2016 based upon estimated revenue from connection fees at 15 per year.

Phase 3 – Project

1) Construct the new slow sand filter treatment facilities, increasing the capacity for 1,100 ERU's. Increase pumping to reservoir to 514 gpm. Construct 48,000 gallon clearwell. Provide for Standby power at treatment facility. Estimated cost: $1,500,000.00.

2) Upgrade existing intake. Estimated cost: $420,000.00

Total Estimated Cost - $2,582,500.00

These facilities can be funded by the connection fees generated by 315 equivalent users.

Sources of Water Supply

Currently the City uses raw water from the Pend Oreille River and filters it by means of slow sand filtration. Water from the Pend Oreille River has proven to be easily filtered and known for its good drinking water quality and low turbidity. In August of 2007, the City applied for and was awarded a water right from the Idaho Department of Water Resources in the amount of 1.34 cfs or 601 gpm. The City is seeking approval to continue using this source for both current and future expansion. See Approved Water Right in the Appendix.

Proposed Treatment Processes

In the Domestic Water System Facilities Plan by James A. Sewell & Associates, it was recommended that additional water demand be met with the use of the existing slow sand filter facility and expanding with the use of membrane filtration. A comparison of the two most used and effective methods of surface water filtration, membrane and slow sand, are as follows:

Membrane Filtration

Membrane filtration is the process of passing pressured water through a filter cartridge to remove particulates. Membrane filtration waste waters are considered wastewater and must be disposed of as wastewater. Systems using membrane technology benefit from the compact size of the plants however must complete pilot studies to confirm proper filtration operations. Membrane systems are a proven method for filtering surface water. This process was summarized in the report by James A. Sewell and Associates. Capital cost comparisons are discussed later in this report.

Slow Sand Filtration

Slow sand filtration is the process of allowing surface water to settle through a bed of filter sand at low velocity, thus removing particulates by physical and biological mechanisms. Slow sand filtration is known for ease of operation and maintenance, and long run times between cleaning with the main downside being the overall building size. Filtration waste waters produced during the ripening stages of the beds can be introduced back into surface water flows. Slow sand filtration is a proven method for filtering surface water and has had great success in the North Idaho area. Capital cost comparisons are discussed later in this report.

No Action

The no action alternative will simply leave the City in the same state in which they are in now and will not allow for any future growth, including the Dover Bay Development. The "No Action" alternative is not a viable solution to the City's needs.

Currently the City of Dover operator holds a Water Treatment II license. If the City were to build a new slow sand facility the license requirement would hold the same, however if the City was to build a new membrane facility, IDEQ would have to take a close look at the license requirement. It is highly likely that a membrane facility of this size would require a Water Treatment III license and possibly additional manpower for the City.

Environmental impacts associated with the above alternatives are few; however they do have some differences. Approval and construction of a slow sand filter facility will not create a waste product that has to be treated and will not require any special permits. There are no environmental impacts from the construction of a slow sand filter facility. A membrane facility will have to include a method of treating backwash effluent or it will have to be sent to the wastewater facility, therefore reducing the amount of available ER's. The only deterrent to isolated areas around the City in means of water supply is to simply get the water there. Water main extensions from already in place trunk lines will easily serve unpopulated areas as the City sees growth. This can become costly for developers or homeowners at the time of installation; however, this is a typical developer/homeowner requirement.

Treatment & Disinfection

To meet Surface Water Treatment Rules, filtration and disinfection must achieve 99.99% removal of inactivation of Giardia cysts and 99.99% removal of viruses. Chlorine treatment from a new Dual Sal-80 Miox on-site chlorination system would provide 2 mg/L chlorine dosage and be introduced to outgoing flows to the reservoirs. The Dual Sal 80 system is capable of producing 20 pounds per day, 30 gallons per hour, or treating 2,400,000 gallons per day. Chlorine dosages will be dependent on the flow paced flow meter supplying data to the PLC. The Dual Sal-80 Miox chlorination system will substantially meet all disinfection needs of the new SSF facility.

Table: 6 Miox Specifications

Miox Dual Sal-80 Specifications	
Free Available Chlorine (FAC) Production (#/day)	20
Water Treatable per Day at 1mg/L Dose (gals)	2,400,000
System Design Flow Rate (gph)	
Softener Flow during Regeneration (gph)	84-120 gph (14-35 gals max)
Electrical Service	20 VAC, 1 Phase, 30A
Number of Dedicated Circuits	2
Frequency (hertz)	50/60
Air Temperature Requirements (F)	42 to 110 degrees F

Feed Water Temperature Requirements (F)	50 to 85 degrees F
Feed Water Pressure Requirements (psi)	>25<100 psi

Chlorine contact is achieved when treated water leaves the facility through an 8-inch dedicated treatment line. Water passing through the treatment line is routed to the 353,824 gallon baffled reservoir and then gravity fed to distribution. Please see the table below for chlorine contact calculations.

The City has no pressure issues when the system is operating on a normal day to day basis. Occasionally, because of new construction or system upgrades, the City will allow pressure to drop below 20 psi, however this only happens after proper notification. In this case, representative samples are always taken to justify water quality.

As mentioned previously, the Dover Bay development has installed a separate irrigation system for users within its boundaries. The irrigation system draws water from the Pend Oreille River and reduces demand placed on the City during the irrigation season. During construction of the irrigation system, an additional sleeve from the vault out into the river, and a 10" transmission line from the vault to the existing SSF were installed. This was foresight from both the developer and the engineer to expand the water treatment capabilities.

The City does have two (2) pressure zones, however completion of work proposed in this facility plan will not affect it. Water for the Cedar Ridge tank and its users is drawn directly from the City's main reservoir. The Cedar Ridge development is the only development in the upper pressure zone and not capable of expansion. Water supplied to the Cedar Ridge Tank is drawn from the City's transmission line to the reservoir.

Pumping requirements to meet the additional uses the City expects to add in the next twenty (20) years after completion of the proposed water system upgrades are not dependant on the alternative chosen. Both alternatives are capable of meeting the pumping and treatment requirements needed to supply water to the additional users. Pumping requirements at build out to be met by both the existing facility and the new facility are 854 gallons per minute.

Currently, the City has 1,382 gallons per connection of available storage. The new proposed facility will also include standby power to assume constant pressure to the City in times of long power outages. At build out of the proposed 1,100 connections, the City would still have 321 gallons per connection of available storage.

The existing CT calculations for the current system are shown as:

- Table 7 – Existing CT Calcs Main Reservoir
- Table 8 – Existing CT Calcs Cedar Ridge

- Table 9 – Proposed CT Calcs at 200 additional Connections
- Table 10 – Proposed CT Calcs at Buildout

Table: 7 Existing CT Calculations – Main Reservoir

Table 7			
Treatment Plant to Reservoir to 1st Connection			
CT Calculations			
Treatment Plant to Reservoir			
Distance to Reservoir		3500	lf
Pumping Rate		230	gpm
Pipe Size		8	inch
Velocity		1.45	fps
Available Time		**40.23**	**Minutes**
Main Reservoir			
Outside Dimension	101'-8" by 59'-2"		
		353,000	gallons
Lowest Operation Le		260,105	gallons
Peak Hourly Demand		412	gpm
Baffling Coefficient		0.6	
Available Time		**378.79**	**Minutes**
Distance to First Connection		2000	lf
Peak Hourly Demand		435	gpm
Pipe Size		8	inch
Velocity		2.23	fps
Available Time		**14.95**	**Minutes**
Total Time Available		433.97	
CT Reqd for 0.5 C and pH of 8.0 (1 log removal)		92	
Required Chlorine Residual		0.21	

Table: 8 Existing CT Calculations – Cedar Ridge

Treatment Plant to Reservoir to Cedar Ridge to 1 st Connection			
CT Calculations			
Treatment Plant to Reservoir			
Distance to Reservoir		3500	lf
Pumping Rate		230	gpm
Pipe Size		8	inch
Velocity		1.45	fps
Available Time		**40.23**	**Minutes**
Main Reservoir			
Outside Dimension	101'-8" by 59'-2"		
Total Volume		353,000	gallons
Lowest Operation Le		260,105	gallons
Peak Hourly Demand		435	gpm
Baffling Coefficient		0.6	
Available Time		**597.94**	**Minutes**
Main Reservoir to Cedar Reservoir			
Distance to Reservoir		1000	lf
Pumping Rate		72	gpm
Pipe Size		6	inch
Velocity		0.91	fps
Available Time		**18.32**	**Minutes**
Total Volume		47,000	
Lowest Operating Level		44000	
Peak Hourly Demand		50	
Baffling Coefficient		0.1	
Available Time		**88**	**Minutes**
Distance to First Connection		600	lf
Peak Hourly Demand (6 Connections Estimated Pk)		50	gpm
Pipe Size		6	inch
Velocity		0.57	fps
Available Time		**17.54**	**Minutes**
Total Time Available		762.03	
CT Reqd for 0.5 C and pH of 8.0 (1 log removal)		92	
Required Chlorine Residual		0.12	mg/L
Required Chlorine Residual		0.00	mg/L

Table: 9 Proposed CT Calculations – At 200 Additional Connections

Treatment Plant to Reservoir to 1st Connection CT Calculations			
Treatment Plant to Reservoir			
Distance to Reservoir		3500	lf
Pumping Rate		230	gpm
Pipe Size		8	inch
Velocity		1.45	fps
Available Time		**40.23**	**Minutes**
Main Reservoir			
Outside Dimension	101'-8" by 59'-2"		
		353,000	gallons
Lowest Operation Le		260,105	gallons
Peak Hourly Demand (200,000 gpd)		555	gpm
Baffling Coefficient		0.6	
Available Time		**468.66**	**Minutes**
Distance to First Connection		2000	lf
Peak Hourly Demand		627	gpm
Pipe Size		8	inch
Velocity		4	fps
Available Time		**8.33**	**Minutes**
Total Time Available		**517.22**	
CT Reqd for 0.5 C and pH of 8.0 (1 log removal)		92	
Required Chlorine Residual		0.18	
Required Chlorine Residual		0.00	

Table: 10 Proposed CT Calculations – At Buildout

Treatment Plant to Reservoir to 1st Connection CT Calculations			
Treatment Plant to Reservoir			
Distance to Reservoir		3500	lf
Pumping Rate		850	gpm
Pipe Size 2 8 inch lines		8	inch
Velocity		2.55	fps
Available Time		**22.88**	**Minutes**
Main Reservoir			
Outside Dimension	101'-8" by 59'-2"		
		600,000	gallons
Lowest Operation Level of Reservoir (7.0)		450,000	gallons
Peak Hourly Demand (500,000 gpd)		1388	gpm
Baffling Coefficient		0.6	
Available Time		**194.52**	**Minutes**
Distance to First Connection		2000	lf
Peak Hourly Demand		1388	gpm
Pipe Size		12	inch
Velocity		3.97	fps
Available Time		**8.40**	**Minutes**
Total Time Available		**225.80**	
CT Reqd for 0.5 C and pH of 8.0 (1 log removal)		92	
Required Chlorine Residual		0.41	
Required Chlorine Residual		0.00	

Table: 11 Production Requirements

City of Dover	11.13.08		Water Treatment Facility Design Calcs			
	No. Filter Beds	Sq. Ft. Per Bed	Loading Rate GPM	GPM per Bed	GPM Total	GPD Total
Existing Facility	4	672	0.075	50	202	290,304
	3	672	0.100	67	202	290,304
Proposed Facility	4	1,725	0.075	129	518	745,200
	3	1,725	0.100	173	518	745,200

Demand	City of Dover	Dover Bay	Total
Proposed Connections	500	600	1,100
Design GPD Needed	1,000	400	
Total	**500,000**	**240,000**	**740,000**
(GPM)	347	167	514

GPD Total Demand	**740,000**

Standard Operation		**No. Beds**		
Existing		4	290,304	@ 0.075 Load Rate
Proposed		4	745,200	@ 0.075 Load Rate
Total		8	**1,035,504**	
Largest Bed Out Of Service		**No. Beds**		
Existing		3	290,304	@ 0.10 Load Rate
Proposed		4	745,200	@ 0.10 Load Rate
Total		7	1,035,504	

GPD Demand	740,000
GPD Production	1,035,504
Difference	**295,504**

Preliminary sizing of treatment facilities is based upon expanding the production of the slow sand filter by 740,000 gallons per day. This allows the treatment plant to operate at a lower filtration rate which allows for longer run times. At the time of design we will reevaluate the uses in the city in order to determine the most economical system design parameters. This value gives the city a basis for proposed facility sizing in order to develop a budget and space requirements for the facilities.

Due to population served and water rates, it is not a feasible option for the City of Dover to get water from another entity, such as the City of Sandpoint. Merging of the two would cause additional problems of line extensions, pressure zones and growth. The City of Dover would no doubt help the City of Sandpoint provide water to a population that is growing faster than its own, however this is not a viable option for the City of Dover.

Public Input

Public input for the accepted and approved alternative will happen once the Facility Plan has been approved and an alternative selected. This information will be submitted separately at a later date.

Final Screening of Principal Alternatives and Facility Plan Adoption

Final screening of the available water filtration alternatives is important in the sense that choosing the best alternative could alleviate future problems and start the City down the path of growth and confidence of the overall system. The correct alternative for one City may not be the correct alternative for another, so both alternatives need to be investigated closely and honestly.

Present Worth Analysis

The below figures represent a comparison of the Net Present Worth over a period of 40 years. These preliminary costs are only for comparison and could possibly change as the project develops. It is predicted that during the design process, O & M costs will better reflect final design decisions.

20 Year Net Present Worth
(Interest Rate 4%)

Slow Sand Filter	
O & M/year	$170,000
Present Worth	$2,310,355
Capital Costs	$1,484,000
Total	**$3,964,355**

Membrane Plant

O & M/year	$201,000
Present Worth	$2,731,655
Capital Costs	$1,550,000
Total	**$4,482,655**

Capital Costs and Financing Plan

Financing for either of the two main alternatives will be through the Dover Urban Renewal Agency (DURA.)

Urban renewal is a program of land redevelopment in areas of moderate to high density urban land use. Renewal has had both successes and failures. Its modern incarnation began in the late 19th century in developed nations and experienced an intense phase in the late 1940s – under the rubric of reconstruction. The process has had a major impact on many urban landscapes, and has played an important role in the history and demographics of cities around the world.

Urban renewal has been seen by proponents as an economic engine and a reform mechanism, and by critics as a mechanism for control. It may enhance existing communities, and in some cases result in the demolition of neighborhoods.

Many cities link the revitalization of the central business district and gentrification of residential neighborhoods to earlier urban renewal programs. Over time, urban renewal evolved into a policy based less on destruction and more on renovation and investment, and today is an integral part of many local governments, often combined with small and big business incentives.

DURA is a board consisting of five members appointed by the Mayor and confirmed by the City Council.

Two statutes which govern urban renewal and revenue allocation financing in Idaho are The Idaho Urban Renewal Law—Title 50, Chapter 20, Idaho Code, and The Idaho Local Economic Development Act—Title 50, Chapter 29, Idaho Code. Following the determination that deteriorated conditions were present in a portion of the city. An Urban Renewal Plan and feasibility study was commissioned on behalf of the Urban Renewal Board

Idaho Code 50-2018

Deteriorated Area: Includes areas in which there are a "predominance of buildings or improvements...which by reason of dilapidation, deterioration, age or obsolescence, inadequate provision for ventilation, light, air, sanitation, or open spaces, high density of population and overcrowding, or the existence of conditions which endanger life or property by fire and other causes, or any combination of such factors is conducive to ill health, transmission of disease, infant mortality, juvenile delinquency, or crime, and is detrimental to the public health, safety, morals or welfare."

Deteriorating Area: Includes areas in which there are a "substantial number of deteriorated or deteriorating structures, predominance of defective or inadequate street layout, faulty lot layout in relation to size, adequacy, accessibility or usefulness, in sanitary or unsafe conditions, deterioration of site or other improvements, diversity of ownership, tax or special assessment delinquency exceeding the fair value of the land, defective or unusual conditions of title, or the existence of conditions which endanger life or property by fire and other causes, or any combination of such factors, substantially impairs or arrests the sound growth of a municipality, retards the provision of housing accommodations or constitutes an economic or social liability and is a menace to the public health, safety, morals or welfare in its present condition and use . . ."

Public Benefits

- Result from urban renewal and revenue allocation financing.
- Job creation from the initial project as well as potential for "spin-off" developments.
- Return of underutilized or deteriorating property to productive use.
- Updated and enhanced capacity of infrastructure for the community at large.
- Improved local transportation systems benefits the community & surrounding area.
- Lower levy rates for residents in the future by increasing local tax base.

Program Goals

- To provide improved access to US Hwy 2/Idaho 200
- To enhance Dover's livability and economic vitality.
- To improve Fire Services response time and fire flow rates.
- To upgrade water and sewer facilities and availability

Essential Requirements

- Implement projects identified in the urban renewal plan.
- Develop financing strategy for plan implementation.
- Investigate/prepare new urban renewal plans.

Operations and Maintenance Costs

Labor costs to operate the facilities greatly depend on the operator classification brought on by the Membrane system. If IDEQ classifies the system as needing an operator with a Water Treatment III license, then the Cities current operator will either have to gain this certification or the City will have to hire an operator with this certification. A backup operator for the City will also need to be considered. Running a membrane plant involves considerably more attention from the operator than a slow sand facility so it is very likely that an additional operator will be needed to assure that duties are being completed.

Costs for the slow sand facility, will remain as they are at present, assuming the operator is capable of operating both facilities simultaneously, which he should be.

Membrane facilities have much higher O & M costs than slow sand facilities. Membrane replacement can be very costly as well as cleaning chemicals which are used in the backwash process. Electrical costs are also much higher from greater demand which in turn increases the size of a generator(s) needed to provide standby power in emergencies. Slow sand facilities costs are primarily limited to sand replacement which is only required approximately every 20 years.

A membrane facility will also require pilot testing to prove water quality performance, however slow sand facilities are already a proven method for water filtration thus not needing pilot testing.

The biggest probable cost for the alternatives is the systems backwash capabilities. Whereas slow sand filters can introduce backwash flows directly back into surface water streams, membrane filters cannot. The estimated costs for treatment of backwash for a membrane facility are shown below.

The below table indicates the cost in wastewater ER hookups that would be lost if the City were to use Membrane technology as a water filtration method. This cost added to the overall cost of the Membrane system, not only well exceeds the cost of a slow sand facility, but depletes the systems resources for wastewater handling.

Table: 12 Membrane Disposal Capital Costs

Proposed Design Flows	740,000 GPD
Membrane Filter Backwash (4% of Design Flow)	28,000 GPD
Wastewater Design Flow per ER	250 GPD
Membrane Filter Backwash ER's Needed	112
Cost per ER	$8,557.75
Total Capital Cost to Treat Backwash	$958,468.00

Comparison of Costs of Alternatives

A comparison of cost alternatives has been provided in the following. The costs included are for the design and construction of the alternatives.

Table: 13 Estimated Project Cost – Slow Sand Filtration Facility

OPINION OF PROBABLE COST					
DATE:	25-Apr-12		PROJECT	8.028	
PROJECT	Water Treatment Facilty				
CLIENT	City of Dover				
ITEM		SCHEDULE OF VALUES			
NO:	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL COST
	Water Treatment Facility				
1	Site Clearing	1	LS	$2,500.00	$2,500.00
2	3/4 - Crushed Aggregate	110	CY	$17.00	$1,870.00
3	Mobilization	1	LS	$60,000.00	$60,000.00
4	Filter BaysClearwell	6900	Sq-ft	$50.00	$345,000.00
6	Cover (Roof)	6900	Sq-ft	$45.00	$310,500.00
7	Yard Piping	1	LS	$40,000.00	$40,000.00
8	Control Piping	1	LS	$80,000.00	$80,000.00
9	Testing	1	LS	$5,000.00	$5,000.00
10	Filter Media	766	CY	$100.00	$76,600.00
11	Miox System	1	LS	$25,000.00	$25,000.00
12	Electrical & Controls	1	LS	$85,000.00	$85,000.00
13	Distribtion Pumps	2	EA	$15,000.00	$30,000.00
14	Standby Power/Generator	1	EA	$80,000.00	$80,000.00
	Sub-Total				**$1,141,470.00**
SUB-TOTAL					$1,141,470.00
Contingency					$114,147.00
Administration					$57,073.50
Engineering					$171,220.50
TOTAL PROJECT COST					**$1,483,911.00**

Estimated Project Cost – Membrane Filtration Facility

According to the 2007 City of Dover Domestic Water System Facility Plan by James A. Sewell and Associates, the implementation cost for a membrane facility to run in sequence with the existing SSF was $1,550,000.00. This cost included construction, installation, electrical and instrumentation, but did not include engineering or disinfection. According to Sewell and Associates, onsite chlorine generation was estimated at an additional $100,000.00. Due to current market value fluctuations, we do not think that this cost has greatly increased or decreased.

Consideration of Impacts to Water System

Both alternatives have low impacts to the water system. Each system in its own way is very capable of meeting everyday system demands while staying within the requirements of the water right. There are no visible impacts to the existing water system.

Environmental Effects of Alternatives

Environmental impacts by both chosen alternatives are low. The main difference between the two alternatives is the waste produced during backwashes. As mentioned prior, the slow sand facility backwash flows are not considered waste and can be introduced right back into surface water sources, whereas the membrane system backwash flows cannot. Membrane system backwash flows are considered waste and have to be treated as wastewater. In the case of the City of Dover, membrane backwash flows would need to be routed to the City's Wastewater Treatment plant.

Public Input

Public input on the selected alternative will be submitted at a later date once public hearings have taken place.

Selected Alternative and Implementation Arrangements

For several reasons, we are recommending the construction of a new slow sand filter facility. Slow sand filtration has proven itself a reliable solution for the City and continuing use of slow sand filtration would benefit in sustaining conformity in operations.

Operations and maintenance costs of running a membrane plant are a considerable amount higher than that of a traditional slow sand filter facility. The certification class of the Operator will most likely increase along with overall time commitment, including the possible need for an additional operator. Costs associated with operating and maintaining a membrane facility such as membrane replacement, consumed energy and waste disposal are all much higher.

The City currently has ample space for a slow sand facility large enough to meet the needs of 1,100 future water system connections and the construction in no way impacts water supply to neighboring systems.

The Pend Oreille River, to be used as the source for both alternatives is a proven reliable source for public drinking water once it has been processed. The City's existing approved water rights do not substantiate enough volume to interfere with users downstream or affect fish or wildlife habitat.

Owner Financing Capabilities

The City of Dover is planning on financing the design and construction through DURA as mentioned prior in this report. DURA is the Dover Urban Renewal Agency and has already agreed to the funding of the chosen alternative. Funds allocated to DURA are for items specifically designated in the Urban Renewal Plan and cannot be used for anything other than their original intended use.

The City of Dover will finance and construct water system upgrades mentioned in this report with funding through the DURA and fees collected from connection fees. For example, associated costs for the new water treatment plant improvements total 1.48 million dollars. The City will collect $8,022.75 for every new water system hookup and DURA collects approximately $2,016.00 for every new home built in the Dover Bay Development through assessed taxes. Together, these funds will be used to secure Tax Increment Financing for the design and construction of the new water treatment facility.

Using both means of financing, we propose the following scheduled financing.

Table: 14 Financial Plan for Water Treatment Plant Development

Estimated Cost of Facilities	$ 2,582,500.00		
Current Connection Fee	$ 8,022.75		
Number of Connections			
Existing Dover	95		
Existing Dover Bay	160		
Connections Available	440		
Capital Available from Connection Fees	$ 3,530,010.00		
Capital Available from Increment (Estimate home value 250,000)	Increment	Available Financing (10 years 4%)	
10 Connections	$ 20,160.00	$ 163,400.00	
50 Connections	$ 100,800.00	$ 817,000.00	
150 Connections	$ 403,200.00	$ 3,270,000.00	
300 Connections	$ 604,800.00	$ 4,905,000.00	
Therefore			Estimated Cost
Current Project Secondary Intake	29 Additional Connections		$ 232,500.00
Phase 1 Connect Cedar Ridge	4 Additional Connections		$ 30,000.00
Phase 2 Transmission Line	50 Additional Connections		$ 400,000.00
Phase 3 Treatment Plant	187 Additional Connections		$ 1,500,000.00
Upgrade Exist Intake	52 Additional Connections		$ 420,00.00
	322	Total	$ 2,582,500.00

Therefore, based upon the proposed Increment Financing, the City and DURA can fully fund the improvements after 140 new connections are added to the system.

Secondary Intake Construction (Present)

During construction of the Dover Bay Development, a 10-inch C-900 water line was installed for future use as a dedicated raw water transmission line. The 10-inch line runs from the existing Dover Bay Development irrigation system and river intake to the existing City of Dover slow sand filter facility. The line is connected to the vault at the lake side and dead ends near the south east corner of the ssf facility. The proposed plan by Sewell & Associates was to install an additional river intake parallel to the Dover Bay Development intake. Due to a nearby marina and backflow of river currents, the City is proposing to parallel the Dover Bay Development river intake line with a 12-inch HDPE pipeline, and then extend the line north into deeper water. An approximate 400 lineal feet of 12-inch HDPE piping will be needed to reach the area intended for the intake.

The actual intake will consist of a 12-inch cast iron 90 bend pointed upward toward the river surface. An 80 slot stainless steel well screen secured by a mechanical joint fitting will prevent debris and river inhabitants from entering the pipe. The 90 bend will be cradled in a 5-foot triangular steel intake base, which will keep it upright and prevent it from shifting. The intake will rest in approximately 40-feet of water when water is at the low water mark.

Due to the 12-inch C-900 sleeve already being in place, no excavation in the river will be necessary. A permit from the U.S. Department of Lands and the U.S. Fish & Game will need to be secured before any work in the river can proceed. This permit has been applied for and can be found in the Appendix.

The new intake will help supplement the existing intake and also allow for the future upgrade of the existing intake. The new intake will also prove beneficial use for water right 96-9336, which is a 1.34 CFS municipal water right with a priority date of 8/22/2007.

The existing 10-inch transmission main constructed by the Dover Bay Development is approximately 2,600 lineal feet and runs from the existing slow sand facility to the irrigation vault at the Dover Bay Marina. The line was put in for the sole purpose of someday providing additional raw water to the slow sand facility site.

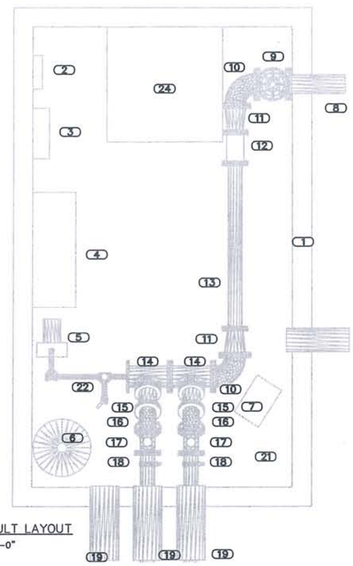
The existing irrigation vault currently has three 12-inch C-900 sleeves that have been constructed out into the Pend Oreille River. Two of the sleeves contain 6-inch HDPE pipe connected to vertical turbine well pumps laying on their sides. The third existing sleeve is for future and will be used for the new intake project.

Due to water depth and the close vicinity of the marina dock, the intake will set an additional 400-feet beyond the present location of the end of the sleeve. The extension of the 12-inch sleeve will be achieved by adapting 12-inch HDPE to the 12-inch C-900 with a cast iron 45 bend. The HDPE pipe will be floated until the connection to the existing sleeve can be made. Once the connection has been made the intake can be positioned with GPS technology and sunk to the bottom. The pipe will need to be fused on site and then floated into place with the use of a boat and barge. The intake will need to be secured to the pipe prior to sinking. The pipe will be secured in place with the use of concrete blocks made especially for this application. The blocks are made in two halves and bolt together around the pipe fitting securely so the pipe cannot move back and forth causing wear on the pipe. The blocks will be placed every 10-feet and will weigh approximately 100 pounds each.

The intake will consist of a 12-inch 80-slot well stainless steel well screen connected to a 12-inch cast iron 90 bend with a mechanical joint adapter and will stand vertically off the bottom of the river bed. A steel cradle triangular in shape and connected to the bottom of the 90 bend will assure that the intake does not fall over. The first concrete block will be secured 18-inches from the 90 bend to add weight at the intake.

The pumping line will consist of a 6-inch HDPE line slid 300 feet into the sleeve with a 6-inch 15 horse power submersible well pump attached at the end. The pump will rest in the C-900 portion of the line and not reach the 45 bend.

In the vault, the 6-inch pumping line will be fixed with a 6-inch globe style silent check valve, resilient seat gate valve, sample tap and air introduction port. The air introduction port will be a separate ¾-inch poly line that travels through the sleeve all the way to the intake and will be used to push air back up through the stainless steel intake, dislodge debris and clean the screen. The 6-inch line will be connected to the 10-inch existing ductile iron line leaving the vault and leading to the slow sand facility.



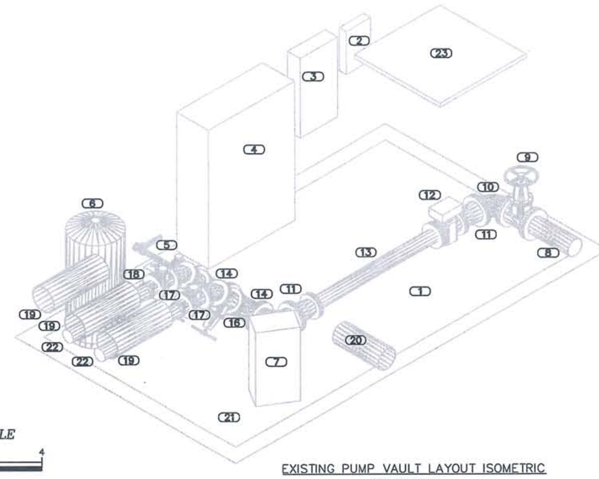
EXISTING PUMP VAULT LAYOUT

SCALE: ¼"=1'-0"

GRAPHIC SCALE

2 0 2 4

SCALE: 1/2"=1'-0"
(FULL SIZE: 22x34)

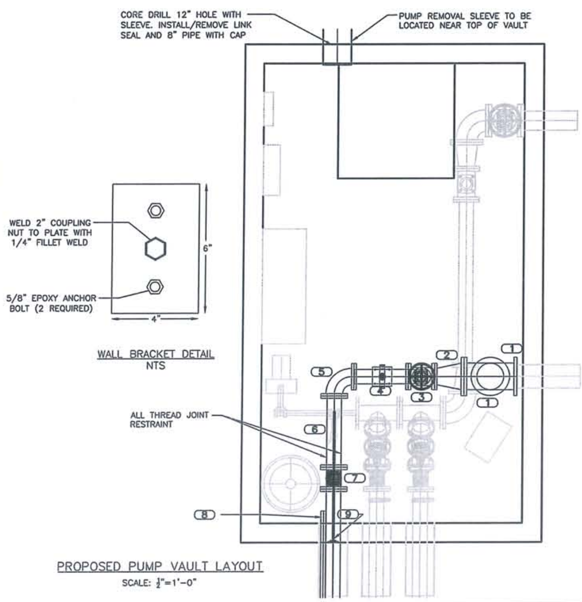


EXISTING PUMP VAULT LAYOUT ISOMETRIC

NOT TO SCALE

EXISTING VAULT

1. VAULT – 16'x9' INSIDE DIM.
2. ELECTRICAL PANEL 14"x4"
3. ELECTRICAL PANEL 21"x7"
4. VFD MOTOR CONTROL PANEL 48"X18"
5. PRIMING PUMP – 5 HP BALDOR
6. PRESSURE TANK – 125 GAL.
7. HUMIDITY CONTROLER
8. 8" D.I. PIPE
9. 8" GATE VALVE
10. 8" 90' BEND
11. 8"x6" REDUCER
12. 6" FLOW METER
13. 6" D.I. SPOOL – 67" LONG
14. 8" TEE
15. 8" GATE VALVE
16. 8" 45' BEND
17. 8" CHECK VALVE
18. 6'x1" DSS SADDLE
19. 12" C-900 SLEEVE
20. 10" D.I. FUTURE SLEEVE
21. 6" FLOOR DRAIN
22. 2" GALV. PIPE
23. 4'x4' DOUBLE LID ALUM. HATCH



WALL BRACKET DETAIL

NTS

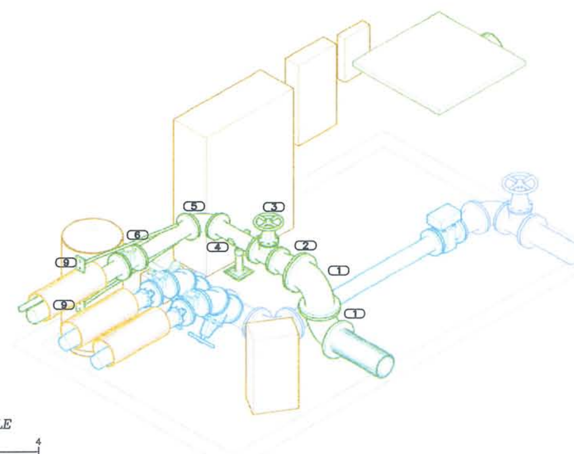
PROPOSED PUMP VAULT LAYOUT

SCALE: ¼"=1'-0"

GRAPHIC SCALE

2 0 2 4

SCALE: 1/2"=1'-0"
(FULL SIZE: 22x34)



PROPOSED PUMP VAULT LAYOUT ISOMETRIC

NOT TO SCALE

PROPOSED VAULT

1. 10" 90' BEND
2. 10" X 6" REDUCER
3. 6" GATE VALVE
4. 6" DIA SPOOL 22.5" LONG
5. 6" 90' BEND
6. 6" HDPE SPOOL
7. 8" CHECK VALVE
8. 3/4" HDPE AIRLINE TO INTAKE W/STANDARD AIR HOSE CONNECTION
9. PIPE RESTRAINT

TATE ENGINEERING
1103 N. 4th Street
Coeur d' Alene
Idaho, 83814
(208)676-8708
FAX: (208)667-2129
E-MAIL: rtate@tate-eng.com

REVISION

NO.	DESCRIPTION	BY	APR.	DATE

PROJECT: 10.038
DRAWING: 10038 BASE
DESIGN BY:dps
DRAWN BY:dps
CHK. BY: RMT
LAST EDIT DATE: 4/26/11

City of Dover Raw Water Intake

City of Dover Located in
Sec 31, T57N., R.2W., B.M., Bonner County, Idaho.

Proposed Pump Vault Layout

SHEET 8 OF 12

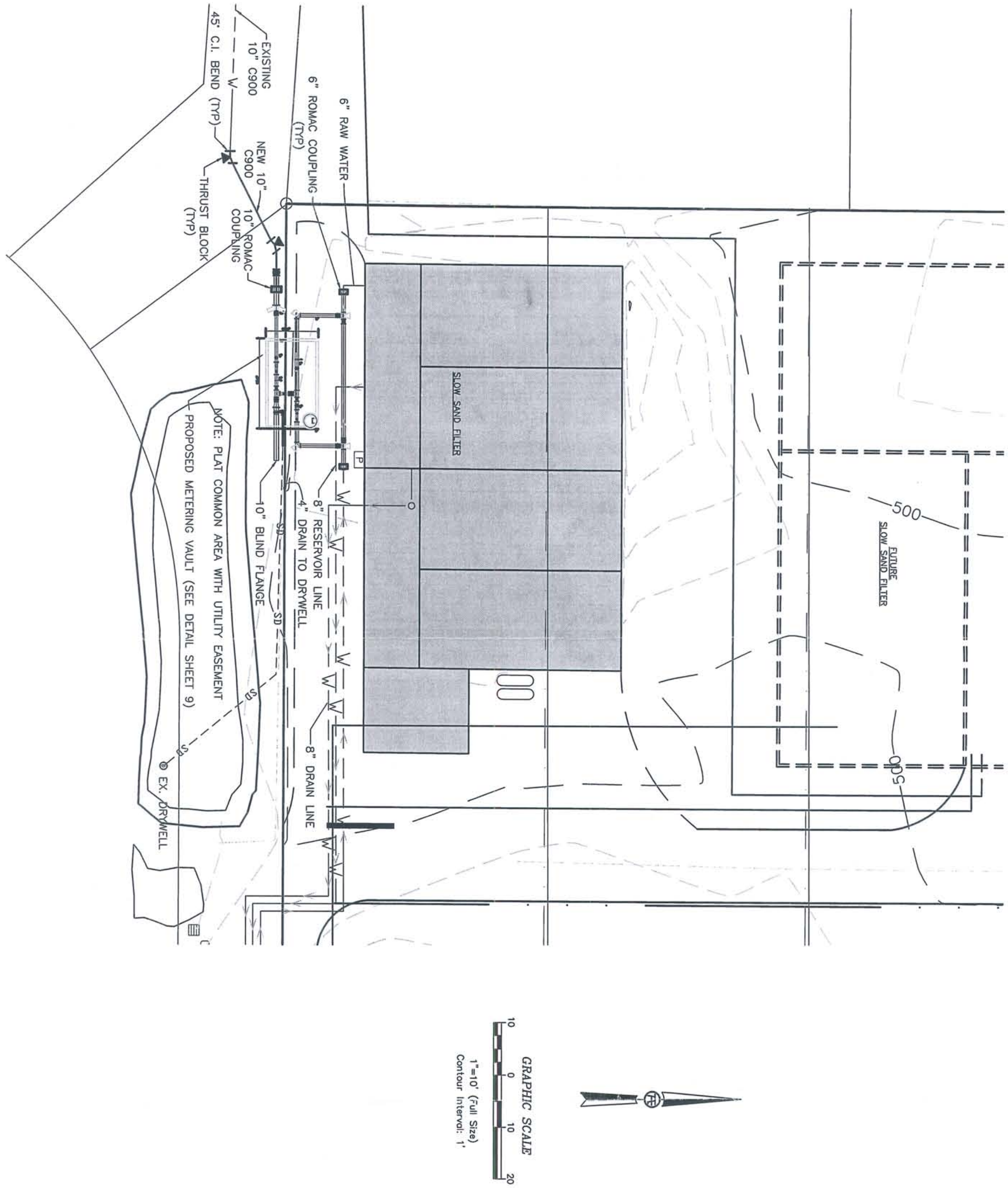
The connection at the other end of the existing 10-inch line will include a vault on the east side of the slow sand facility. The vault will provide a means for connecting into the existing slow sand facility feed line and providing future supply for a new slow sand facility. The vault will also include flow meters and check valves for both sources.

Table: 15 Secondary Water Intake Opinion of Costs

		Estimate of Construction Expenses			
DATE:	5-May-12		PROJECT NO:	4.48	
PROJECT		Water System Intake			
CLIENT		City of Dover			
ITEM		SCHEDULE OF VALUES			
NO:	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL COST
	New Intake				
1	Mobilization	1	ls	$5,000.00	$5,000.00
2	Erosion Control	1	ls	$3,000.00	$3,000.00
3	Extend Intake	600	lf	$75.00	$45,000.00
4	Well Screen	1	ls	$4,500.00	$4,500.00
5	Face Piping	1	ls	$48,000.00	$48,000.00
6	Pump (300gpm)	1	ea	$9,000.00	$9,000.00
7	Electrical and Controls	1	ls	$62,000.00	$62,000.00
8	Connection at Treatment Plant	1	ls	$6,000.00	$6,000.00
9	Generator	1	ls	$25,000.00	$25,000.00
10	Vault and Connection	1	ls	$25,000.00	$25,000.00
	Sub-Total				**$232,500.00**

Cedar Ridge Reservoir

Currently, the Cedar Ridge Reservoir is fed via booster pump from the main reservoir. There is a return line with a manual valve that allows water to be returned to the main reservoir in the event of an emergency. In order to use both reservoirs simultaneously, a float control valve in a vault will need to be installed that can fill the main reservoir in the event of a low water situation. This is estimated to cost $30,000.00.



TATE ENGINEERING
1103 N. 4th Street
Coeur d' Alene
Idaho, 83814
(208)676-8708
FAX: (208)667-2129
E-MAIL: rtate@tate-eng.com

REVISION

NO.	DESCRIPTION	BY	APR.	DATE

PROJECT: 10.038
DRAWING: 10038 BASE
DESIGN BY: dps
DRAWN BY: dps
CHK. BY: RMT
LAST EDIT DATE: 4/26/11

City of Dover Raw Water Intake

City of Dover Located in
Sec 31, T57N., R.2W., B.M., Bonner County, Idaho.
Proposed Vault at SSF Site

New Slow Sand Filtration Facility

Construction details for the proposed slow sand filter facility are called out below. Details are called out for both an existing raw water intake and new raw water intake. The design of the new intake is limited due to existing design and components.

Building Construction

The City is proposing to build a Slow Sand Filtration Facility, separate of their existing one; however, to be located on the same property. A four bay filtration facility of approximately 1,725 square feet per bay or a total 6,900 square feet would produce 129 gpm per bay or 517 gpm total. These calculations have been based on the existing facility design hydraulic loading rate or 0.075 gallons per minute per square foot. This rate was confirmed as a satisfactory design rate through pilot testing prior to construction of the original filtration facility. The overall size of the building would be approximately 100-feet by 85-feet and house a clearwell capable of holding 48,000 gallons. Set backs on the property are proposed as follows: The back of the filtration facility will rest 10-feet off the west property line and the south side of the building will sit 30-feet north of the existing SSF facility. The total square footage of the new facility is proposed at 8500, which is 27% of the overall lot.

Construction materials for the new proposed facility consist mainly of concrete, with a stick frame portion housing the control room. Concrete walls forming the bays are proposed to be constructed 10-inch thick and twelve feet high. Number five rebar at 6-inches on center provides wall stability in addition to 8-inch hollow core decking used to cover the bays. The facility floor shall be 12-inches thick and contain number 4 rebar at 12-inches on center. All concrete portions of the facility shall be tested and comply with Section 703 of the ISPWC, 2005 edition. The minimum 28 day strength required for the concrete shall be 4000 psi and leak testing shall be consistent with AWWA standards D110-95 and D115-95. Leakage shall be no more than 0.05% of the tank volume over a 24-hour period. Hollow Core decking will cover the bays only and aid in wall stability while being encased in a 4-inch thick monolithic concrete pour with number 4 rebar at 12-inches on center. The concrete roofing will have a 2-percent grade expelling water away from the control building. The finished floor elevation of the new facility will sit approximately 4-feet lower than the existing grade of the lot, leaving 8-feet of concrete wall and 1-foot of roof exposed for a total of 9-feet of exposed concrete.

6-inch PVC screened vents will provide ventilation to the bays. Vents shall have a minimum of 12-inches clearance between the concrete roof decking and the screened portion of the vent.

Aluminum access hatches shall allow ingress egress through the ceilings of the bays and will consist of Haliday aluminum 24-inch by 36-inch, sealed and lockable. Ingress and egress for general maintenance of sand removal and replacement will be in the sides of the bays and shall consist of 3-foot by 6-foot steal hollow core doors, also lockable.

The control room will be surrounded by the bay structures and will be the only portion of the building with stick frame construction. 4-foot high walls completed with 2x6 construction will bear pre-engineered manufactured trusses on 2-foot centers, sheeted with 5/8-inch exterior plywood and #15 felt building paper. Roofing will be 29 gauge metal Delta Rib and have a metal ridge cap with vent. The roof pitch will be 4/12 and have a 50-pound per square foot snow load rating. Interior wood construction will consist only of ½-inch AC plywood sheeting, painted white. Wood structure portions of the control room will be insulated with R-19 insulation in the ceiling and R-13 in the walls.

The clearwell, which sits within the control room, will be constructed of concrete and meet the same design criteria as the bays in regards to wall thickness and rebar. The clearwell walls will be 8-feet tall with the bottom of the 6-inch PVC overflow at 7-feet from the finished floor. The approximate overall outside dimensions will be 31-feet by 28-feet and will hold approximately 40,464 gallons. A 4-inch monolithic concrete pour will cover the Hollow Core decking and provide a base for two (2) 24-inch by 36-inch aluminum access hatches and two (2) 6-inch PVC screened vents. A CE submersible level transducer will control levels in the clearwell. The clearwell overflow and drain will direct water to the 8-inch drain line located under finished floor slab and include a 1-inch air gap where finished water and drain line intercept.

All exposed face piping will be ductile iron pipe and will be supported by Standon model S92 saddle supports or secured to the wall with Unistrut A1000 HS style channel supports. Ductile iron weep rings will be used where pipes pass through the concrete walls between the control room and filter bays. In the event that holes are cored after the construction of the walls, Link Seals will be used to prevent leaking and seepage around the pipe.

Under drain piping will be constructed with 4-inch schedule 40 PVC pipe and consist of approximately 23 runs, each 30-feet in length, approximately 690 lineal feet per bay or 2,760 lineal feet total. 6-inch by 4-inch PVC tees will upsize the line to 6-inch before draining it through the filter bay wall into the control room. Under drain piping will rest 4-inches off the finished filter bay floor directly in the center of a 12-inch layer of pea gravel, under 4-inches of coarse sand, under 3 ½-feet of filter sand. All filter media must be approved by the Department of Environmental Quality prior to placement in the filter bays.

An existing 10-inch C-900 raw water line will deliver water to the filter building. Just outside of the facilities footing, a 10-inch by 8-inch cast iron reducer will reduce the raw water flow to an 8-inch ductile iron pipe. The 8-inch ductile iron pipe will carry water to all four bays eventually reducing to a 4-inch manifold inside the filter bay. The manifold will be supported and secured with stainless steel P1000 Unistrut mounting gear. The raw water manifold will secure to the wall approximately 2-feet above the finished sand level and consist of a 4-inch by 5-foot perforated ductile iron pipe. A Hach 2200 PCX Particle counter will record raw water suspended particles and transmit data to the PLC.

The facilities drain line will be constructed of 8-inch schedule 40 PVC. The 8-inch drain line will extend around the majority of the perimeter of the control room, ending in an 8-inch cleanout. Filter bay drains and overflows will direct water to the drain located under the finished floor slab. A 1-inch air gap will be provided wherever finished water and the drain intercept. 4-inch floor drains will prevent the building from flooding and provide a means of disposal for water drained in the process of the chlorine analyzer and the turbidimeter. Separate floor drains will direct chemical spills to the sewerage system. The drain line will exit the building and drain water to the slough approximately 400-feet away. This drain line will be constructed alongside the existing facility drain line, giving each facility its own means of disposal.

Filtered water will exit the filter bays by entering the 4-inch PVC under drains and flowing out through the 6-inch manifold located approximately 2 ½-feet from the filter bay wall. 6-inch ductile iron pipe will deliver filtered water to the clearwell by means of head pressure created from raw water at a level of 2 to 3-feet above the sand. Filtered water flow will be controlled by resilient seat gate valves constructed on the 6-inch ductile iron pipe on the control room side. Four (4) Hach Filter Trak 660 Laser Nephelometers with Hach SC1000 probe module read outs will measure filtered water turbidity, one from each bay and send the results to the PLC. The PLC will average results from all four (4) bays and assure the turbidity levels are maintained less than 0.5 NTU at a 95% level.

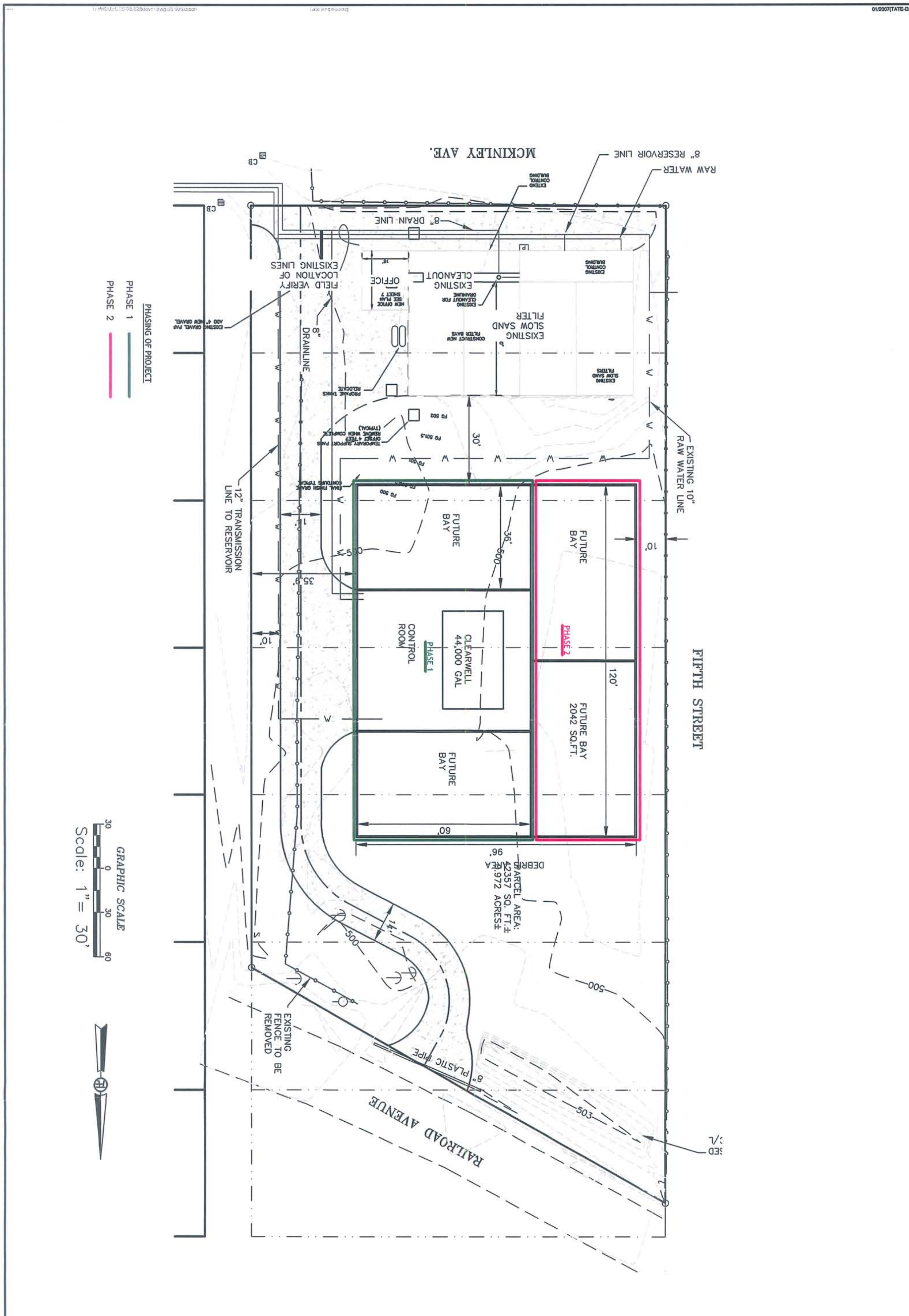
A 10-inch ductile pipe penetrating the clearwell 6-inches above the finished floor in two locations, will serve as the pump suction line. The pump suction line will directly feed four (4) Grundfos distribution pumps who in turn pump water out of the building and into an existing dedicated transmission line that directs water to the baffled reservoir. The pumps will consist of two (2) smaller pumps to meet daily demand flows, and two (2) larger pumps that will assist in peak demand and fire flows. The smaller pumps will be Grundfos CR-45-3-2, 460 volt 3 phase, 20 hp with a pumping capacity of 300 gpm at 170' TDH. The larger pumps will be Grundfos CR-90-2, 460 volt 3 phase, 40 hp and have a pumping capacity of 550 gpm at 170' TDH. Filtered water will be pumped into 12-inch ductile iron piping where it will pass through a 12-inch Flowmatic slanted disc check valve, 10-inch Sitrans Magflo 5100W flow meter with a MAG 500 transmitter, and get treated with 3% chlorine solution from a Dual Sal 80 Miox on-site chlorination system. The MAG 500 flow meter transmitter will transmit water flow data to a common touch screen PLC and also flow pace the LMI chemical feed pump. Other components on the pumping side of the new facility will include a smooth nosed sample tap, pressure gauges, pressure tank and pump to waste valve. Preliminary calculations based on pump outflow research suggest the facility could pump approximately 750 gallons per minute to available system storage, in addition to the existing filtration facility; however, flows are expected to be more in the range of 600 gallons per minute.

A single 6-inch ductile iron pipe will penetrate the back of the clearwell and serve as the pump suction line for the filtered water recirculation system. A level transducer within the clearwell will notify the PLC to activate the recirculation pumps when levels in the clearwell approach the overflow pipe. Pumps will consist of two (2) Ebara SS Centrifugal, model 3U4 0-125 and be 230/460 volt 3 phase, 1 hp with a pumping capacity of 188 gpm at 9' TDH. Water circulated from the clearwell will be directed through a 6-inch ductile iron pipe necked down to a 4-inch and will enter each bay above the overflow level to assure that cross connection with the clearwell is not possible. Slanted disc check valves downstream of the recirculation pumps will keep the lines full and aid in water hammer when the pumps fire. Facility water balancing will be achieved with the help of a 4-inch Sitrans Magflo flow meter with transmitter. The transmitter will transmit water flow data to the PLC for record keeping.

4-inch ductile iron pipe secured to the concrete wall with Unistrut gear will penetrate each bay approximately 6-inches above the finished sand level and act as filter bay equalization. Each equalization bay penetration will be valved with a 4-inch resilient seat gate valve so the bay can be isolated for cleaning when necessary. Filter bay equalization is necessary in helping maintain constant head pressure from each bay and assists the operator in regulating outflow as well as preventing overflow.

A 1-inch metered dedicated potable water service will enter the west side of the building and provide drinking water for the emergency eye wash/shower station, wash basin, Miox system and also act as the source for the chlorine analyzer.

Because the existing 3,500-foot treated water transmission line is 8-inch, it will need to be upsized to 12-inch in order to operate the new facility efficiently. This is a project that can effectively be completed in the future when demand has risen to a point where the 8-inch is no longer capable of meeting system needs.



SHEET 1 OF 1	**TATE ENGINEERING** 1103 N. 4th Street Coeur d' Alene Idaho, 83814 (208)676-8708 FAX: (208)667-2129 E-MAIL: rtate@tate-eng.com	**REUSE OF DRAWINGS** THIS DOCUMENT, AND THE IDEAS AND DESIGNS INCORPORATED HEREIN, AS AN INSTRUMENT OF PROFESSIONAL SERVICE, IS THE PROPERTY OF TATE ENGINEERING, Inc. AND IS NOT TO BE USED, IN WHOLE OR PART, FOR ANY OTHER PROJECT WITHOUT THE EXPRESS WRITTEN AUTHORIZATION OF TATE ENGINEERING, Inc. REVISION NO. DESCRIPTION BY APPR. DATE	PROJECT: 08.028SSBCON DRAWING: 08.028 DESIGN BY: BLC DRAWN BY: DCH CHK. BY: RMT LAST EDIT DATE: 11/26/08

Water Treatment Plant Upgrade Project
Sec.32 Twp.57N. R.2W.B.M.
City of Dover, Bonner County, Idaho.

Existing Intake Upgrade (Future)

The raw water pumping system will consist of a flooded wet well with submersible pumps resting on the bottom, water will be pumped up through the wet well and into the existing 10-inch dedicated C-900 water line. Before the proposed wet well and raw water intake can take affect however, an additional water right in the amount of 1.10 CFS or 493 gallons per minute will be needed to supplement the existing water right of .23 CFS.

Table: 16 Project Elevations

Low Water	2050' Elevation
High Water	2062' Elevation
Wet Well Rim	2065' Elevation
Wet Well top of Pipe Invert	2047' Elevation
Bottom of Wet Well	2045' Elevation
River Intake	1995' Elevation
SSF Raw Water Manifold	2078' Elevation

Wet well construction and pumping components will consist of the following: The wet well will consist of six (6) 6-foot manhole sections with an inside diameter of 8-feet. Manhole sections will be constructed of 5,000 psi concrete at 28 days curing, and conform to ASTM-C478 specifications. Manhole sections will include plastic steps located vertically at 12-inch intervals and joints will be sealed with two (2) strips of 1-inch butyl rubber. Sidewalls of the manhole will be 8-inch thick, while the bottom will be 10-inch thick. 4-inches of pea gravel will need to be placed on top of native soil compacted to 95-percent standard proctor. The manhole access will be constructed with the use of a 36-inch by 36-inch Haliday F1R aluminum locking hatch and rest at 2065-feet above sea level. The bottom elevation of the wet well be at 2045-feet, 5-feet below the low water mark. 12-inch HDPE pipe will penetrate the wet well at 2047-feet and be sealed with a rubber gasket and stainless steel straps. There will be approximately 5-feet of flooded water when water is at its lowest point, and each foot of wet well holds approximately 376 gallons of water, giving the pumps approximately 3,000 gallons of water for operation when water is at the low water mark of 2050-feet. A 12-inch resilient seat gate valve just outside of the wet well will act as an isolation point in times of emergency and also aid in introducing air into the raw water line. With the use of a 12-inch stainless steel service saddle and ¾-inch poly pipe, an air line will be created to inject air into the line, cleaning out the raw water line and the 80 slot screen secured at the intake.

In an effort to meet State of Idaho Drinking Water Rules by supplying redundancy, the wet well pumping system will consist of three (3) submersible pumps, all capable of 300 gpm. Hydromatic S4N Non Clog submersible pumps rated at 300 gpm at 52' TDH will be secured in place with three Hydr-o-rail pump guides. Proposed Hydromatic pumps will be 7 ½ horsepower, 230/460 volt 3 phase with 4-inch discharges. The discharge elbow base plate assembly will rest on the floor of the wet well and the pump will include a leveling bolt and adjustable guide rail supports. The sealing face of the elbow will be zinc coated for abrasion and corrosion and all fasteners shall be 300 series stainless steel. A hydraulic sealing flange with Buna N rubber diaphragm gasket will be mounted at each pump discharge and held in place by a clamp ring and stainless steel fasteners. Each pump shall have a carrier guide bracket and lifting chain or cable of sufficient strength and able to reach from the bottom to the top of the proposed wet well. Hydr-o-rail guide rails will be constructed of 2-inch corrosion resistant pipe and positioned on the centerline of the pump to assure that no weight is distributed on the guide rails or on the hydraulic flange. The pump will be automatically connected to the discharge connection elbow when lowered into place and shall be sealed to the flange from the linear downward motion of the pump.

Table: 17 Existing Raw Water Upgrade Opinion of Costs

		Estimate of Construction Expenses			
DATE:	2-May-12		**PROJECT NO:**	4.48	
PROJECT		Water System Intake			
CLIEN T		City of Dover			
ITEM			**SCHEDULE OF VALUES**		
NO:	**DESCRIPTION**	**QUANTITY**	**UNIT**	**UNIT PRICE**	**TOTAL COST**
	Upgrade Existing Intake				
1	Mobilization	1	ls	$5,000.00	$5,000.00
2	Erosion Control	1	ls	$3,000.00	$3,000.00
3	8" C900 Pump Suction Line	1700	lf	$80.00	$136,000.00
4	Intake Screen	1	ls	$5,000.00	$5,000.00
5	Intake Manhole	1	ls	$15,000.00	$15,000.00
6	Pump	2	ea	$12,000.00	$24,000.00
7	Electrical and Controls	1	ls	$120,000.0 0	$120,000.00
8	8" C900 Raw Water Line	2400	lf	$30.00	$72,000.00
9	Generator	1	ls	$40,000.00	$40,000.00
	Sub-Total				**$420,000.00**

Sewerage System Available

The existing City of Dover Wastewater System will be responsible for handling wastes from the proposed facility. Wastes will be very minimal and consist primarily of flows from the emergency shower/eye wash station and the chlorine containment area. A wastewater service for the proposed facility is readily available and there are sanitary services located within the existing facility. The existing City of Dover Wastewater Facility has the capacity for 1,000 connections.

Waste Disposal

Water wasted or drained from the slow sand filtration facility will be routed the same as water from the existing treatment facility. A new 8-inch drain line will be constructed approximately 400-feet along side of the existing drain line and lead to the slough. This will require two road crossings, but keep the facility drain lines separate. Since there are no separation requirements, the two lines will occupy the same trench and easement. This is an acceptable and legal means of disposal for wasted raw water from the facility.

Automation

Automated components and procedures within the proposed facility will include turbidimeter, chart recorder, Miox Chlorination System, flow paced chlorine injection pump, flow meter, level transducers, recirculation pumps and distribution pumps. Standby power in the form of a diesel generator will supplement the facility and assure water production in times of power outages.

A PLC with touch screen readout will not only control all operations within the facility, but will also record and display data. Separate screens on the touch screen will display such data as: clearwell level, filter bed level, reservoir level, turbidity levels, particle counter readings, recirculation pump operations, distribution pump operations, distribution outflow gpm, system pressure, and standby power operations. The PLC will be responsible for not only controlling operations of the plant, but for providing the operator with vital data of daily plant operations.

Control Logic

Raw Water Pumps

Raw water pumps will be controlled by floats located in the slow sand filter bays via SCADA radio control. Information sent between the raw water pumps and the PLC will not only operate the pumps in lead/lag sequence, but operate the alarm system when an occurrence such as low water, pump failure or generator failure has occurred. The PLC will allow pump operation in automatic or hand configuration from the slow sand filter facility, as well as track vital information like start/stops and pump run hours.

Filter Bay

Floats located in the filter bays will transmit level data to the PLC which in turn will decipher the information and display the filter bay level for each bay individually. Normally the filter bay level will be constant due to the equalization tube, however in times of bed maintenance, the bay will be isolated and this will be evident when viewing the level data on the PLC. This same information will also be used to call for water from the wet well, and signal alarms in the event the filter bays have low water or are overflowing. High water alarms will prevent the wet well pumps from pumping water to the filter bays and also prevent the recirculation pumps from circulating water from the clearwell to the filter bays. Filter bays will continuously filter water and flow to the clearwell, only regulated manually with butterfly valves by the operator, so alarm signaling from the PLC is crucial in assisting the operator in prevention of facility failure.

Clearwell

Water flowing continuously into the clearwell will be monitored by a level transducer. The level transducer will transmit data to the PLC which will in turn display clearwell data on the touch screen. The level of the clearwell will be used by the PLC to operate the recirculation pumps, and signal alarms such as high/low level, and overflow. The low level alarm will prevent the distribution pumps from operating and causing damage to the pumps. The PLC will operate the recirculation pumps when the level transducer indicates a level of 6-inches below overflow. Distribution pumps will be called on by the PLC when the level of the system reservoir depletes to the point of needing additional water. In the same manner, the distribution pumps will shut off once system demand has been met and the reservoirs demand has been satisfied.

Backup Power

Both the raw water pumping station and the slow sand filtration facility will be supported with propane/natural gas powered backup generators. A 25 KW Generac generator, complete with 2.4 liter engine and steel weather resistant protection containment, will handle energy needs for the raw water pumps and assure that filter beds are operational. The slow sand filtration facility will need a 100 KW Generac propane/natural gas generator to be able to meet electrical load needs. Both generators meet and or exceed IDAPA rules for Drinking Water.

Project Sites

The project site is owned by the City and consists of 0.972 acres of flat ground surrounded by residential area. The existing filtration facility currently rests on this same site and was constructed in a manner suitable for the construction of a building this size. The site is relatively flat and is at 2075-feet above sea level, surrounded by residential housing.

Financing

Financing has already been secured and will be provided by the Urban Renewal Agency. The estimated cost of the proposed slow sand filter facility is $2,200,000. Financing through the Urban Renewal Agency is typically as much as 18-months on the back side of improvements. As long as the City of Dover and the Dover Bay Development are allowed to continue growing, money for the new slow sand filter facility will become available. This report has outlined usage based on State of Idaho current design criteria for designing and constructing water system upgrades. Actual usages are well beneath the design criteria and this needs to be taken in to consideration during the design and construction of the new facility. Actual water usage on peak days in 2008 only reached 96,000 gallons per day. This computes to an average of 66 gpm from a system capable of producing 200 with 353,000 gallons of storage. Although it would never be asked of IDEQ to allow sub standard design standards, we are asking for leniency during the period of design and construction. The City of Dover needs to continue making improvements and growing if Urban Renewal money is to be available. In a nut shell, if the City of Dover does not build the proposed slow sand filter facility, thus raising taxes and creating funding through improvements, they will not have the means to pay for it.

Future Extensions

Although future extensions other than those mentioned in this report are unlikely in the near future, the project site is large enough to accommodate yet a third filtration facility the same size as the existing if ever needed.

Transmission Line Upgrade

In accordance with scenario 1 discussed earlier in this report, a new 12-inch PVC C900 transmission line will be constructed next to the existing 8-inch. Construction will include 810 lineal feet of waterline placed within 3 feet of the existing line. Although the scenario was ran with only the 12-inch line to show the increase in fire flow, there will be no reason abandon the 8-inch line and it will add additional flow to the scenario results along with redundancy. A construction estimate has been included below.

Table: 18   12-Inch Transmission Line Upgrade

Estimate of Construction Expenses					
DATE:	7-Jan-12		PROJECT NO:	4.48	
PROJECT		Transmission Line Upgrade			
CLIENT		City of Dover			
ITEM		SCHEDULE OF VALUES			
NO:	DESCRIPTION	QUANTITY	UNIT	UNIT PRICE	TOTAL COST
1	Mobilization	1	ls	$15,000.00	$15,000.00
2	Erosion Control	1	ls	$8,000.00	$8,000.00
3	12" C900	2400	lf	$45.00	$108,000.00
4	Trenching and backfill	2400	lf	$25.00	$60,000.00
5	Bedding	2400	lf	$3.00	$7,200.00
6	Testing	1	ls	$1,000.00	$4,000.00
7	Fittings/valves	15	ea	$1,500.00	$22,500.00
8	Hwy 200 Crossing	1	ls	$25,000.00	$25,000.00
9	Railroad Crossing	1	ls	$20,000.00	$45,000.00
	Sub-Total				**$294,700.00**
	Contingency				$30,000.00
	Engineering/Admin				$60,000.00
	Total				**$384,700.00**

Appendix

CITY OF DOVER

BONNER COUNTY, IDAHO

Ordinance # 80

AN ORDINANCE FOR THE CITY OF DOVER, BONNER COUNTY, IDAHO, REGULATING AND ADMININSTERING CROSS-CONNECTION CONTROL POLICY; PROVIDING DEFINITIONS APPLICABLE TO AND USED IN THE ORDINANCE; PROVIDING AND ASSIGNING MAINTENANCE RESPONSIBILITY FOR THE SYSTEM; PROVIDING FOR ENFORCEMENT PROVISIONS; PROVIDING FOR PUBLICATION AND EFFECTIVE DATE OF THE ORDINANCE.

Section 1. CROSS-CONNECTION CONTROL – GENERAL POLICY

1.1 Purpose. The purpose of this Ordinance is:

1.1.1 To protect the public potable water supply of *City of Dover* from the possibility of contamination or pollution by isolating within the consumer's internal distribution system(s) or the consumer's private water system(s) such contaminants or pollutants which could backflow into the public water systems; and

1.1.2 To promote the elimination or control of existing cross-connections, actual or potential, between the consumer's in–plant potable water system(s) and non-potable water system(s), plumbing fixtures and industrial piping systems; and

1.1.3 To provide for the maintenance of a continuing Program of Cross-Connection Control which will systematically and effectively prevent the contamination or pollution of all potable water systems.

1.1.4 **Responsibility.** The *Certified Water System Technician* shall be responsible for the protection of the public potable water distribution system from contamination or pollution due to the backflow of contaminants or pollutants through the water service connection. If, in the judgement of said *Official* an approved backflow prevention assembly is required at the consumer's water service connection; or, within the consumer's private water system for the safety of the water system, the *Official* or his designated agent shall give notice in writing to said consumer to install such an approved backflow prevention assembly(s) at a specific location(s) on his premises. The *City of Dover* shall immediately install such an approved backflow prevention assembly(s) at the cities expense.

1.1.5 Payment. The City will bill the owner the actual cost of the installation of the backflow device and amortize over the next 6 months to be included in the water billing.

Section 2. DEFINITIONS

2.1 Water Commissioner or Health Official. The Certified Water System Technician in charge of the Water Department of the City of Dover is invested with the authority and responsibility for the implementation of an effective cross-connection control program and for the enforcement of the provisions of this ordinance.

2.2 Approved.

a. The term "approved" as herein used in reference to a water supply shall mean a water supply which has been approved by the health agency having jurisdiction.
b. The term "approved" as herein used in reference to an air gap, a double check valve assembly, a reduced pressure principle backflow prevention assembly or other backflow prevention assemblies or methods shall mean an approval by the administrative authority having jurisdiction.

2.3 Auxiliary Water Supply. Any water supply on or available to the premises other than the purveyor's approved public water supply will be considered as an auxiliary water supply. These auxiliary waters may include water from another purveyor's public potable water supply or any natural source(s) such as a well, spring, river, stream, harbor, etc., or used waters or industrial fluids. These waters may be contaminated or polluted or they may be objectionable and constitute an unacceptable water source over which the water purveyor does not have sanitary control.

2.4 Backflow. The term "backflow" shall mean the undesirable reversal of flow of water or mixtures of water and other liquids, gases, or other substances into the distribution pipes of the potable supply of water from any source or sources. See terms Backsiphonage (2.6) and Backpressure (2.5).

2.5 **Backpressure.** The term "backpressure" shall mean any elevation of pressure in the downstream piping system (by pump, elevation of piping, or steam and/or air pressure) above the supply pressure at the point of consideration which would cause, or tend to cause, a reversal of the normal direction of flow.

2.6 **Backsiphonage.** The term "backsiphonage" shall mean a form of backflow due to a reduction in system pressure which causes a subatmospheric pressure to exist at a site in the water system.

2.7 **Backflow Preventer.** An assembly or means designed to prevent backflow.

2.7.1 **Air gap.** The term "air gap" shall mean a physical separation between the free flowing discharge end of a potable water supply pipeline and an open or non-pressure receiving vessel. An "approved air gap" shall be at least double the diameter of the supply pipe measured vertically above the overflow rim of the vessel – in no case less than 1 inch (2.54 cm).

2.7.2 **Reduced Pressure Principle Backflow Prevention Assembly.** The term "reduced pressure principle backflow prevention assembly" shall mean an assembly containing two independently acting approved check valves together with a hydraulically operating, mechanically independent pressure differential relief valve located between the check valves and at the same time below the first check valve. The unit shall include properly located resilient seated test cocks and tightly closing resilient seated shutoff valves at each end of the assembly. This assembly is designed to protect against a non-health (i.e., pollutant) or a health hazard (i.e., contaminant). This assembly shall not be used for backflow protection of sewage or reclaimed water. This assembly shall be UL Listed.

2.7.3 **Double Check Valve Backflow Prevention Assembly.** The term "Double check valve backflow prevention assembly" shall mean as assembly composed of two independently acting, approved check valves, including tightly closing resilient seated shutoff valves attached at each end of the assembly and fitted with properly located resilient seated test cocks. (See Specifications, Section 10 for additional details). This assembly shall only be used to protect against a non-health hazard (i.e., pollutant). This assembly shall be UL Listed.

2.8. **Contamination.** The term "contamination" shall mean an impairment of the quality of water which creates an actual hazard to the public health through poisoning or through the spread of disease by sewage, industrial fluids, waste, etc.

2.9. **Cross-Connections.** The term "cross-connection" shall mean any unprotected actual or potential connection or structural arrangement between a public or an consumer's potable water system and any other source or system through which it is possible to introduce into any part of the potable system any used water, industrial fluid, gas, or substance other than the intended potable water with which the system is supplied. Bypass arrangements, jumper connections, removable sections, swivel or change-over devices and other temporary or permanent devices through which or because of which backflow can or may occur are considered to be cross-connections.

a. The term "direct cross-connection" shall mean a cross-connection which is subject to bolt backsiphonage and backpressure.
b. The term "indirect cross-connection" shall mean a cross-connection which is subject to backsiphonage only.

2.10 **Cross-Connections—Controlled.** A connection between a potable water system and a non-potable water system with an approved backflow prevention assembly properly installed and maintained so that it will continuously afford the protection commensurate with the degree of hazard.

2.11 **Cross-Connection Control by Containment.** The term "service protection" shall mean the appropriate type or method of backflow protection at the service connection, commensurate with the degree of hazard of the consumer's potable water system.

2.12 **Hazard, Degree of.** The term "degree of hazard" shall mean either a pollutional (non-health) or contamination (health) hazard and is derived from the evaluation of conditions within a system.

2.12.1 **Hazard – Health.** The term "health hazard" shall mean an actual or potential threat of contamination of a physical or toxic nature to the public potable water system or the consumer's potable water system that would be a danger to health.

2.12.2 **Hazard—Plumbing.** The term "plumbing hazard" shall mean an internal or plumbing type cross-connection in a consumer's potable water system that may be either a pollutional or contamination type hazard. This includes but is not limited to cross-connections to toilets, sinks, lavatories, wash trays and lawn sprinkling systems. Plumbing type cross-connections can be located in many types of structures including homes, apartment houses, hotels and commercial or industrial establishments. Such a connection, if permitted to exist, must be properly protected by an appropriate type of backflow prevention assembly.

2.12.3 **Hazard—Pollutional.** The term "pollutional hazard" shall mean an actual or potential threat to the physical properties of the water system or the potability of the public or the consumer's potable water system but which would not constitute a health or system hazard, as defined. The maximum degree or intensity of pollution to which the potable water system could be degraded under this definition would cause a nuisance or be aesthetically objectionable or could cause minor damage to the system or its appurtenances.

2.12.4 **Hazard—System.** The term "system hazard" shall mean an actual or potential threat of severe danger to the physical properties of the public or the consumer's potable water system or of a pollution or contamination which would have a protracted effect on the quality of the potable water in the system.

2.13 **Industrial Fluids.** The term "industrial fluids" shall mean any fluid or solution which may be chemically, biologically or otherwise contaminated or polluted in a form or concentration which would constitute a health, system, pollutional or plumbing hazard if introduced into an approved water supply. This may include, but not be limited to: polluted or contaminated used water; all types of process water and "used waters" originating from the public potable water system which may deteriorate in sanitary quality; chemicals in fluid form; plating acids and alkalies; circulated cooling waters connected to an open cooling tower and/or cooling waters that are chemically or biologically treated or stabilized with toxic substances; contaminated natural waters such as from wells, springs, streams, rivers, bays, harbors, seas, irrigation canals or systems, etc.; oils, gases, glycerine, paraffins, caustic and acid solutions and other liquid and gaseous fluids used industrially, for other processes, or for fire fighting purposes.

2.14 **Pollution.** The term "pollution" shall mean an impairment of the quality of the water to a degree which does not create a hazard to the public health but which does adversely and unreasonably affect the aesthetic qualities of such waters for domestic use.

2.15 **Water—Potable.** The term "potable water" shall mean any public potable water supply which has been investigated and approved by the health agency. The system must be operating under a valid health permit. In determining what constitutes an approved water supply, the health agency has final judgment as to its safety and potability.

2.16 **Water—Non-potable.** The term "non-potable water" shall mean a water supply which has not been approved for human consumption by the health agency having jurisdiction.

2.17 **Water—Service Connection.** The term "service connection" shall mean the terminal end of a service connection from the public potable water system, (i.e., where the water purveyor may lose jurisdiction and sanitary control of the water at its point of delivery to the consumer's water system). If a water meter is installed at the end of the service connection, then the service connection shall mean the downstream end of the water meter.

2.18 Water—Used. The term "used water" shall mean any water supplied by a water purveyor from public potable water system to a consumer's water system after it has passed through the service connection and is no longer under the control of the water purveyor. See Section 7.2.3.33.

Section 3. REQUIREMENTS

3.1 Water System

3.1.1 The water system shall be considered as made up of two parts: The Water Purveyor's System and the Consumer's System.

3.1.2 Water Purveyor's System shall consist of the source facilities and the distribution system; and shall include all those facilities of the water system under the complete control of the purveyor, up to the point where the consumer's system begins.

3.1.3 The source shall include all components of the facilities utilized in the production, treatment, storage, and delivery of water to the distribution system.

3.1.4 The distribution system shall include the network of conduits used for the delivery of water from the source to the consumer's system.

3.1.5 The consumer's system shall include those parts of the facilities beyond the termination of the water purveyor's distribution system which are utilized in conveying potable water to points of use.

3.2 Policy

3.2.1 No water service connection to any premise shall be installed or maintained by the water purveyor unless the water supply is protected as required by the City of Dover laws and regulations and this *Ordinance*. Service of water to any premise shall be discontinued by the water purveyor if a backflow prevention assembly required by this *Ordinance* is not installed, tested and maintained, or if it is found that a backflow prevention assembly has been removed, bypassed, or if an unprotected cross-connection exists on the premises. Service will not be restored until such conditions or defects are corrected.

3.2.2 The consumer's system should be open for inspection at all reasonable times to authorized representatives of the *City of Dover* to determine whether unprotected cross-connections or other structural or sanitary hazards, including violations of these regulations, exist. When such a condition becomes known, the *Official* shall deny or immediately discontinue service to the premises by providing for a physical break in the service line until the consumer has corrected the condition(s) in conformance with the *City of Dover* statutes relating to plumbing and water supplies and the regulations adopted pursuant thereto.

3.2.3 An approved backflow prevention assembly shall also be installed on each service line to a consumer's water system at or near the property line or immediately inside the building being served; but, in all cases, before the first branch line leading off the service line wherever the following conditions exist:

a. In the case of premises having an auxiliary water supply which is not or many not be of safe bacteriological or chemical quality and which is not acceptable as an additional source by the *Official*, the public water system shall be protected against backflow from the premises by installing an approved backflow prevention assembly in the service line commensurate with the degree of hazard.
b. In the case of premises on which any industrial fluids or any other objectionable substance in handled in such a fashion as to create an actual or potential hazard to the public water system, the public system shall be protected against backflow from the premises by installing an approved backflow prevention assembly in the service line commensurate with the degree of hazard. This shall include the handling of process waters and waters originating from the water purveyor's system which have been subject to deterioration in quality.
c. In the case of premises having (1) internal cross-connections that cannot be permanently corrected or protected against, or (2) intricate plumbing and piping arrangements or where entry to all portions of the premises is not readily accessible for inspection purposes, making it impracticable or impossible to ascertain whether or not dangerous cross-connections exist, the public water system shall be protected against backflow from the premises by installing an approved backflow prevention assembly in the service line.

3.2.4 The type of protective assembly required under subsections 3.2.3a, b, and c, shall depend upon the degree of hazard which exists as follows:

a. In the case of any premise where there is an auxiliary water supply as stated in subsection 3.2.3.a of this section and it is not subject to any of the following rules, the public water system shall be protected by an approved air gap or an approved reduced pressure principle backflow prevention assembly.
b. In the case of any premise where there is water or substance that would be objectionable but not hazardous to health, if introduced into the public water system, the public water system shall be protected by an approved double check valve backflow prevention assembly.
c. In the case of any premise where there is any material dangerous to health which is handled in such a fashion as to create an actual or potential hazard to the public water system, the public water system shall be protected by an approved air gap or an approved reduced pressure principle backflow prevention assembly. Examples of premises where these conditions will exist include sewage treatment plants, sewage pumping stations, chemical manufacturing plants, hospitals, mortuaries and plating plants.
d. In the case of any premise where there are unprotected cross-connections, either actual or potential, the public water system shall be protected by an approved air gap or an approved reduced pressure principle backflow prevention assembly at the service connection.
e. In the case of any premise where, because of security requirements or other prohibitions, or restrictions, it is impossible or impractical to make a complete in-plant cross-connection survey, the public water system shall be protected against backflow from the premises by either an approved air gap or an approve reduced pressure principle backflow prevention assembly on each service to the premise.

3.2.5 Any backflow prevention assembly required herein shall be a make, model and size approved by the *Official*. The term "Approved Backflow Prevention Assembly" shall mean as assembly that has been manufactured in full conformance with the standards established by the American Water Works Association entitled:

AWWA/ANSI C510-92[1] Standard for Double Check Valve Backflow Prevention Assemblies;

AWWWA/ANSI C511-92[1] Standard for Reduced Pressure Principle Backflow Prevention Assemblies;

---

[1] Prior to 1989 the AWWA/ANSI C506 Standard covered both the double check valve assembly and the reduced pressure principle backflow prevention assembly.

And, have met completely the laboratory and field performance specifications of the Foundation for Cross-Connection Control and Hydraulic Research of the University of Southern California (USC FCCCHR) established in:

> Specifications of Backflow Prevention Assemblies – Section 10 of the most current edition of the *Manual of Cross-Connection Control.*

Said AWWA and USC FCCCHR standards and specifications have been adopted by the *City of Dover.* Final approval shall be evidenced by a "Certificate of Compliance" for the said AWWA Standards; or "Certificate of Approval" for the said USC CCCHR Specifications; issued by an approved testing laboratory.

The following testing laboratory has been qualified to test and approved backflow prevention assemblies:

> Foundation for Cross-Connection Control and Hydraulic Research
>
> University of Southern California
>
> KAP-200 University Park CMC-2531
>
> Los Angeles, California 90089-2531

Testing laboratories other than the laboratory listed above will be added to an approved list as they are qualified by the *City of Dover.*

Backflow preventers which may be subjected to backpressure or backsiphonage that have been fully tested and have been granted a Certificate of Approval by said qualified laboratory and are listed on the laboratory's current list of approved backflow prevention assemblies may be used without further test or qualification.

3.2.6 It shall be the duty of the consumer at any premise where backflow prevention assemblies are installed to have a field test performed by a certified backflow prevention assembly tester upon installation and at least once per year. In those instances where the *Official* deems the hazard to be great enough he may require field tests at more frequent intervals. These tests shall be at the expense of the water user and shall be performed by a certified tester. The consumer shall notify the *Water Department* in advance when the tests are to be undertaken so that an official representative may witness the field tests if so desired. These assemblies shall be repaired, overhauled or replaced at the expense of the consumer whenever said assemblies are found to be defective. Records of such tests, repairs and overhaul shall be kept and made available to the *Water Department*.

3.2.7 All presently installed backflow prevention assemblies which do not meet the requirements of this section but were approved devices for the purposes described herein at the time of installation and which have been properly maintained, shall, except for the testing and maintenance requirements under subsection 3.2.6, be excluded from the requirements of these rules so long as the *Water Department* is assured that they will satisfactorily protect the water purveyor's system. Whenever the existing device is moved from the present location or requires more than minimum maintenance or when the Water Department finds that the maintenance constitutes a hazard to health, the unit shall be replaced by an approved backflow prevention assembly meeting the requirements of this section.

3.2.8 The *Water Department* shall make recommendations for rules and policies with respect to the enforcement of this ordinance. All such rules and policies shall be consistent with the provisions of this ordinance as reviewed and approved by the City Council.

Approved and made effective after publication on the ___th day of _____________, 2005.

____

Paul "Randy" Curless, Mayor

____

Ruth Guthrie, City Clerk

CITY OF DOVER

RESOLUTION NO. 65

A RESOLUTION OF THE CITY OF DOVER, A MUNICIPAL CORPORATION OF THE STATE OF IDAHO, SETTING NEW MONTHLY USER FEES FOR CITY WATER USERS AND PROVIDING FOR AN EFFECTIVE DATE.

WHEREAS, the Mayor and City Council have determined that it is in the best interests of the City to set new monthly user fees capable of supporting operations, maintenance and debt repayment; and

WHEREAS, City Ordinance No. 105 establishes provisions for calculating and assessing various water facility charges by Resolution; and

WHEREAS, the City Council held a duly noticed Public Hearing on August 19, 2010, for citizen comment regarding the New Monthly User Fees for water service.

NOW THEREFORE, BE IT RESOLVED, by the Mayor and Council of the City of Dover, Bonner County, Idaho, that:

Effective September 26, 2010, the Monthly User Fees for water service are hereby set at
Thirty-eight Dollars ($38.00) per month for active accounts and
Twenty-four Dollars ($24.00) per month for in-active accounts.

Upon a motion and second to approve the foregoing Resolution, the following vote was recorded:

Councilwoman Burge	AYE
Councilwoman Becker	AYE
Councilman Janish	ABSENT
Councilman Darling	AYE

Upon the above Council vote, the text of the foregoing was duly enacted as a Resolution of the City Council of the City of Dover, Idaho on this 19th day of AUGUST, 2010.

BONNER COUNTY, IDAHO
CITY OF DOVER

Paul "Randy" Curless
Randy "Paul" Curless, Mayor

ATTEST:
Kym Holbert
Kym Holbert, City Clerk

Water Right Report

IDAHO DEPARTMENT OF WATER RESOURCES
Water Right Report

11/18/2010

WATER RIGHT NO. 96-8592
Owner TypeName and Address
Current OwnerCITY OF DOVER
PO BOX 464
DOVER, ID 83825
(208)263-1518

Priority Date: 03/15/1990
Basis: License
Status: Active

SourceTributary
PEND OREILLE RIVERLAKE PEND OREILLE

Beneficial UseFromToDiversion RateVolume
MUNICIPAL1/0112/310.23 CFS
Total Diversion 0.23 CFS

Location of Point(s) of Diversion:

PEND OREILLE RIVERNENESWSec. 32Township 57NRange 02WBONNER County

Licensed Diversion Capacity: 0.23

Place(s) of use: No POUs found for this right

Conditions of Approval:

1.Place of use is within the city limits of Dover.
2.004The issuance of this right does not grant any right-of-way or easement across the land of another.

Dates:
Licensed Date: 08/30/1994
Decreed Date:
Permit Proof Due Date: 6/1/1992
Permit Proof Made Date: 5/18/1992
Permit Approved Date: 5/21/1990

Permit Moratorium Expiration Date:
Enlargement Use Priority Date:
Enlargement Statute Priority Date:
Water Supply Bank Enrollment Date Accepted:
Water Supply Bank Enrollment Date Removed:
Application Received Date: 03/15/1990
Protest Deadline Date:
Number of Protests: 0

Other Information:
State or Federal:
Owner Name Connector:
Water District Number:
Generic Max Rate per Acre:
Generic Max Volume per Acre:
Civil Case Number:
Old Case Number:
Decree Plantiff:
Decree Defendant:
Swan Falls Trust or Nontrust:
Swan Falls Dismissed:
DLE Act Number:
Cary Act Number:
Mitigation Plan: False

Water Right Report

IDAHO DEPARTMENT OF WATER RESOURCES
Water Permit Report

11/18/2010

WATER RIGHT NO. 96-9336

Owner TypeName and Address
Current OwnerCITY OF DOVER
PO BOX 115
DOVER, ID 83825
(208)263-8339

Priority Date: 08/22/2007
Status: Active

SourceTributary
PEND OREILLE RIVERCOLUMBIA RIVER

Beneficial UseFromToDiversion RateVolume
MUNICIPAL01/0112/311.34 CFS
Total Diversion 1.34 CFS

Location of Point(s) of Diversion:

PEND OREILLE RIVERNESE Lt 1Sec. 31Township 57NRange 02WBONNER County

Place(s) of use: Large POU Info

Conditions of Approval:

1.124Place of use is within the service area of the City of Dover municipal water supply system as provided for under Idaho Law.
2.180A map depicting the place of use boundary for this water right at the time of this approval is attached to this document for illustration purposes.
3.01MAfter specific notification by the Department, the right holder shall install a suitable measuring device or shall enter into an agreement with the Department to determine the amount of water diverted from power records and shall annually report the information to the Department.
4.26AProject construction shall commence within one year from the date of permit issuance and shall proceed diligently to completion unless it can be shown to the satisfaction of the Director of the Department of Water Resources that delays were due to circumstances over which the permit holder had no control.

Dates:
Proof Due Date: 11/01/2012
Proof Made Date:
Approved Date: 11/26/2007
Moratorium Expiration Date:
Enlargement Use Priority Date:
Enlargement Statute Priority Date:
Application Received Date: 08/22/2007
Protest Deadline Date: 10/08/2007
Number of Protests: 0
Field Exam Date::
Date Sent to State Off:
Date Received at State Off:

Other Information:
State or Federal:
Owner Name Connector:
Water District Number:
Generic Max Rate per Acre:
Generic Max Volume per Acre:
Swan Falls Trust or Nontrust:
Swan Falls Dismissed:
DLE Act Number:
Cary Act Number:
Mitigation Plan: False