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April 15, 2004

Humboldt Bay Municipal Water District
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Attn.: Ms. Carol Rische

Re: Future Water Use by Industrial Water Users in Humboldt County

Parsons Brinckerhoff (PB) prepared the "Port of Humboldt Bay Harbor Revitalization Plan" in 2003 for the Humboldt Bay Harbor, Recreation and Conservation District, Humboldt County, and the City of Eureka. The goal of this plan is to establish a new and sustainable maritime focus for the community. As part of the planning effort, 80 existing parcels around Humboldt Bay were identified and grouped into 16 major sites for marine-related commercial or industrial development. A market analysis was conducted and a number of revitalizations scenarios were developed and analyzed. The Harbor Revitalization Plan recommended that the community focus its marine-dependent development on five key sites totaling almost 1,000 acres, with site sizes ranging from 50 to 350 acres.

At the request of the Humboldt Bay Municipal Water District (HBMWD), PB has been retained to provide estimates of future water use by potential marine-dependent industrial and commercial users within the District's service area. These estimates are based on development opportunities outlined in the Port of Humboldt Bay Harbor Revitalization Plan as well as other opportunities which may exist in the District's service area. This report is provided to the HBMWD in support of its application for water rights renewal with the California State Water Resources Control Board. In preparing this report, PB has reviewed existing literature for typical water usage by various industries; and, has contacted companies within a variety of industry sectors to discuss their water usage. PB did not review future residential water usage, or the commercial development required to support future population growth. Water usage by this sector of the community was estimated by others directly for HBMWD. At the request of the HBMWD, we have assumed a 25-year time frame for this study.

Introduction

Humboldt County has two significant advantages over other locations for current and potential future industrial customers: (1) large Port sites located on the deepwater shipping channel with a significant amount of available land; and (2) an abundance of available raw water from the HBMWD. Considering these two important advantages for attracting and retaining economic activity in the area, our study has focused on marine based industries with significant water needs.

At the present time, HBMWD has the infrastructure to supply approximately 20 mgd of treated potable water and approximately 60 mgd of raw non-potable water. Current average water usage is approximately 10-11 mgd of potable water and 14-15 mgd of non-potable water. The major user of the non-potable water is the existing pulp mill facilities at the Port of Humboldt Bay.

Another significant advantage of the Humboldt County area is its existing recreational/tourist based economy. Dependence on this sector of the economy is expected to continue well into the future. Therefore, PB has also looked at water usages by selected commercial recreational type

facilities, which could make use of both the abundant water supply in the District and the available land within the Port of Humboldt Bay.

Major Industrial Water Users

In researching potential water consumption by marine-dependent industries it was concluded that the large water using industries most likely to expand or develop within the service area of the HBMWD are:

- **Pulp mill facilities**
- **Energy generation facilities**
- **Marine-dependent manufacturers**
- **Public aquarium and/or marine science facilities**

Pulp Mills - The major water user within the District at the present time is the existing pulp mill facility, at approximately 15 mgd. Additionally, in the recent past pulp mills accounted for an even greater water need, using almost all of the available 60 mgd of raw non-potable water. Based on the existing pulping facilities usage, an additional pulp mill located at the Port of Humboldt Bay would require approximately 15 mgd of raw non-potable water. The current difficulty associated with the establishment of another mill in the area is the general downturn in the US economy and the specific shortage of available local wood fiber for pulping. However, the presence of the marine port facilities for wood fiber importation, the past experience of the County with the pulping industry, and the anticipation of an improved economy makes Humboldt County very competitive for siting any pulp industry facilities over the next 25-years.

Energy Generation Facilities - In discussing the industrial situation within the County, it was found that the existing power generation facilities has both nearly reached its capacity and is approaching its useful life. Therefore, it is anticipated that new, additional power generation could be required during the next 25-years. Given the available sources of fuel for a new power plant, it is very possible that such a facility could be located on one of Humboldt Bay's marine-dependents sites so as to utilize imported fuels. The primary water usage for the various types of power generation facilities that would typically be built for Humboldt County is cooling water. An estimate of the amount of water required for a Humboldt County facility is difficult to accurately identify, since the amount of water needed can vary significantly depending on the cooling process used (single pass versus multiple recirculation) and whether fresh water or sea water is used. A typical steam type generating facility uses approximately 80 gallons per kwhr (Linsley and Franzini, *Water Resources Engineering*, McGraw Hill Book Company, 1979). Based on this number a power plant generating a continuous average of 10MW would require approximately 20 mgd of water. Estimates for a future power plant project in Humboldt County forecasted as much as 30 mgd, again depending on the water source and cooling system design.

Marine-Dependent Manufacturers - PB contacted a number of companies located on the West Coast and in comparable locations in order to determine their typical water usage. These are companies that generally utilize marine facilities as part of their operation, either to receive raw materials and/or to distribute their finished product. Presented below is a listing of the typical water usage for these companies.

Water usage statistics reported by the various contacted companies varied in their units. In all cases the reported values were converted to units of mgd in order to make them comparable with each other and the available supply capacity from the HBMWD. The numbers reported by the various contacted companies were generally average flow values. In some instances, peak flow values were reported. In considering the water needs of a particular industry it is important to consider not only the average annual needs, but the peak water needs as well. The ratio of peak

water needs over average water usage can vary greatly between industries and between individual companies as a result of the specific process used, on-site storage, etc. Reported ratios of peak to average water usage vary from 2 to 10 times or more. In order to account for peak industrial water flow rates, and assuming that not every future Humboldt County industrial company is likely to have peak water usage occurring at the same time; a peaking factor of 3 was used in the development of this report.

Potential water usage rates are as follows:

Company	Average Water Usage (mgd)	Peak Water Usage (mgd)
US Gypsum (wallboard)	0.30	0.90
Steelscape (steel manufacturing)	0.13	0.40
American Bridge (bridge manufacturer and supplier)	0.04	0.13
RMC Pacific Materials (bulk cement distributor)	Use very little raw water (for landscaping and personnel only)	NA

Public Aquarium/Marine Science Facilities - As a result of Humboldt County's thriving tourist economy, PB also investigated the water usage of various west coast facilities that are based on recreational usage. In particular, an aquarium, or aquarium/research facility associated with Humboldt State University, seemed likely candidates for future construction at the Port of Humboldt Bay within the next 25-years.

Potential water usage rates are as follows:

Facility	Average Water Usage (mgd)	Peak Water Usage (mgd)
Seattle Aquarium (average and peak usage are based on actual numbers provided)	0.36	0.72
Hatfield Marine Science Center (average and peak usage are based on actual numbers provided)	0.01	0.10

Another potential user of the port properties is a "destination" type golf resort facility, although this use may be inconsistent with the marine-related zoning of the subject properties. Estimates were available for a similar facility planned elsewhere on the Pacific Coast. Climate at this planned facility is similar to that at Humboldt County so water usage for irrigation (the primary water-use) would also be similar. Average water usage for a destination golf resort would be in the range of 0.58 mgd, with peak water usage of 1.36 mgd.

Other Industrial Water Use Considerations

As additional industrial/recreational customers establish themselves in Humboldt County the need for additional fire flow capacity becomes important. A complete review of existing fire flow capacity was beyond the scope of this report; however, it is reasonable that additional capacity would be required as the county grows.

Typical fire flow rates for an industrial facility are on the order of 2,000 to 3,000 gpm for a sustained period of say 6 hours. Exact requirements are normally developed by Underwriters Laboratory or other insurance agency for the type of facility, taking into account specifics of the water supply agency's system (capacity, storage, etc.), and other facilities connected to the same overall water supply system. In the case of the US Gypsum facility contacted for their typical

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water usage, a value of 2500 gpm was required. In developing future fire flow needs for industrial development, assumptions are made as to the number of fires that could breakout at the same time within the service area of the water supplier.

If additional delivery of 2,500 gpm were required for fire flow, this amounts to an additional delivery capacity of 3.6 mgd during the fire fighting period. If it is assumed that this additional fire flow is required for a six hour period, and that storage within the water system used during the fire fighting must be replaced within 24 hours, the 3.6 mgd results in an additional District system capacity of 0.9 mgd.

Conclusions

One of the major advantages of the Humboldt County area for industry over other locations is its abundance of available water for industrial and recreational usage. This benefit is not available in other areas within the United States. As industrial companies look to expand, this benefit, coupled with the availability of port facilities, will draw them to consider Humboldt County.

Major water using industries which can be located in the area include pulp mill and power generation facilities. Additional smaller water using facilities such as marine-dependent industry and recreational facilities, are also likely to be drawn to the Port of Humboldt Bay and surrounding area.

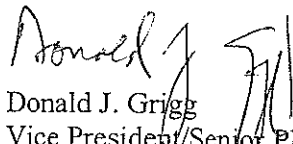
Based on the research performed, the individual marine-dependent industries that could potentially expand or develop in Humboldt Bay could each involve peak daily water consumption ranging from 0.1 mgd (for a marine science center) to 15 mgd (for a pulp mill) and 30 mgd (for a power plant). Typical peak water consumption for the marine-dependent manufacturers surveyed is in the 0.1 to 1.0 mgd range.

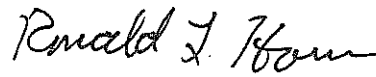
Given the substantial waterfront land resources in Humboldt Bay, the district has the industrial land capacity to attract a very large number of marine-dependent industries. The approximately 1,000 acres of priority marine-dependent property in Humboldt Bay could easily accommodate 20 or more new industries, even allowing 100- to 200-acre sites for large industries such as a pulp mill or power plant. On this basis, we conclude that Humboldt Bay has the capacity to attract marine-dependent industries with total daily water consumption in 5 to 35 mgd range.

We appreciate the opportunity to prepare this assessment and report for the HBMWD. If you have any questions regarding the report or findings therein, please contact us.

Very truly yours,

PARSONS BRINCKERHOFF QUADE & DOUGLAS, INC.


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