

## San Francisco Bay Visibility sensors

During our visit I tried to impart the needed information for sitting the sensors at locations around the bay to Mr. Lopez, Ens Hawn, Mr. Steinbrugge, and Mr. Bailey. I have tried to give a brief summary for each site visited and some additional suggested sites that we could not visit at the time. If Mr Lopez, Steinbrugge, and Hawn were to visit these additional sites and provide Mr Bailey or myself with the information we can assist in evaluation of the site for locating the sensor.

### **Oakland Pier 34: (Top choice Oakland side)**

This area has at least four sites along the pier, the site identified as the best at this time is the bollard near the existing meteorological (met) station on pier 34. Of all the sites along this pier it would be the least impacted by any ship operations that might occur in the future. This site has the advantage of being close enough to the existing met station to be added as a sensor to the suite of sensors at this station. AC Power access to this site however could be the longest run of any at this site, though due to time and other access restrictions it was not determined if AC power could be reached from a closer point on the adjoining pier 32.

### **Oakland Pier 38:**

Two sites at the end of the pier show some promise, however both have issues that could significantly impact the operations of the sensor. Both sites had the advantage of easy access to power, however from talking with the port of Oakland representative that accompanied us during our visit to this site informed us that the site at corner of pier 38 which is the closest site to the Oakland bar CMA was a very active area. Ship and crane operations would / could pose issues for the operation of the sensor. Also the only spot to mount the sensor looks to be at the top of an existing camera pole that has an open location at the top. This location could work however it would still be impacted by port operations, and would poise a service and maintenance logistics issues.

The second site is along the "end of pier" about midway facing the Oakland Harbor CMA. This site is near an existing power sub-station. The area is used for trailer storage by a port customer if this site were to be selected a protective fence might need to be erected to keep equipment from being stored in the surrounding area. This site would need to attain agreements with the port and the port customer that holds the lease for this area of the port.

### **Yerba Buena Island:**

Three sites were visited here at this location; permitting and access should not be a problem at the sites visited. Impact to operations might be the issue at two of the sites. The Lighthouse though nice could have issues with the way fog dynamics would be impacted by it sitting near the steep sides of the island. A site near the end of the USCG base in the ATON buoy area this site has limited space and moving the buoys back enough to allow for proper operation of the sensor would / could greatly impact the

effective work area for the USCG buoy repair yard. A bracket could be installed off the pier extending over the water to remain clear of the Buoy Yard. A third site would be the best, in this general area.

**USCG Operations pier: (Top Choice YBI side)**

This site has potential for sitting the sensor, centrally located at the end of the pier either on the pier deck or mounted on the pier face. At the time of visit pier usage could not be determined, however the end of the pier did not appear to be used for dockage of vessels, and power looked to be easily accessed from a nearby light. The area impacted by the mounting of the sensor, with supporting Data Collection Platform (DCP) is about a 3 ft X 6 ft area. This could be lessened by face mounting the sensor on the end of the pier instead of on the pier deck. Photos and drawings could be provided if this site were selected. A deck mounting could be installed to extend the sensor over the water which prevents further incursion on pier space.

**San Francisco Entrance:**

During my visit we were not able to make a visit to the water level station located on the former USCG pier near the Golden Gate Bridge and Crissy field. This location could be evaluated by Mr Lopez, Hawn, and Steinbrugge, the visibility sensor could be added to the suite of sensors at this location if it is an appropriate site for the sensor to be located.

**Richmond Harbor:**

This area we visited four sites, of them one stood out as the best located at the corner between Point Potrero Marine Terminals 6 & 7. Sites at Ferry Point were not secure and the permitting and site upgrades would / could be very expensive and time consuming. Another site at an adjacent Foss pier parking lot might work however maintenance of the surrounding bushes and the parking lot would / could impact the performance of the sensor.

Additional sites were suggested to be visited in the future since timing did not allow for site visit, at the existing Richmond PORTS station however from pictures seen this site might not be the best for sensor operations. Another site suggested along the Richmond channel at the Brickyard Cove Marina was not visited but could / should be considered for a potential site for the visibility sensor.

**Richmond Pier 7: (Point Potrero) Corner between Point Potrero Marine Terminals 6 & 7.**

There is a newly established met station near this site however it sitting on top of a nearby building would not be applicable to proper operation the visibility sensor or provide a useful number for the Richmond CMA. This site is located on the pier near the face of the pier in the turn for Richmond inner harbor CMA. There is an open fence area between the work areas for the Red Oak Victory and the secure operational area of Point Potrero Marine Terminal 7. A fence with a large gate could be added thus securing the sensor for the general public. Or the sensor could be move inside the secure fence area. Power access looks to be at a power pole by the Red Oak Victory support facility. This area could be impacted by port operations in this area though ships I'm told use this area for intermitted tie up at this location.

**San Francisco: (Islais Creek, CMA)**

Four sites were visited at this location; one stood out more than the other three as a best site for the sensor north end of Pier 94. Two sites at Pier 80 and one at Pier 92 were visited. Pier 92 presents a number of issues power access and vessel operations at this location would impact the operation of the sensor.

**Pier 94: (North end) top choice for this CMA**

This site is in a secure port area, power access is about 50 feet away, the sensor could be mounted either on the pier deck or on the pier face at the north end of the pier. There is currently a fence across this area however the port rep. indicated that this fence could be moved to accommodate the sitting of the sensor. This location is about 300 yards south of the Islais Creek CMA.

**Pier 80: (North End) second choice for this CMA**

This site is also in a secure port area, power access is about 100 yards away, the sensor could be mounted on the pier deck in the corner this area is an operational part of the pier, and however it has some structure issues with crane stops and pier fender support on the pier deck that could influence the sitting of the sensor here. This site is about 500 yards to the north of Islais Creek channel.

**Pier 80: (South End) third choice for this CMA**

This site for the most part is within the CMA at this location. Power access looks to be about 50 feet away. However issues at this site are that it is less secure than the two above, the protective fender wall exceeds the height of the pier deck by about two feet this has the effect of lowering the effective height of the sensor by two feet. Also there are crane stops within the sensor area. The cranes could or might be moved to these stops in the near future for the duration of the Americas Cup that is going to have the base of operations for a number of teams along the Islais creek side of Pier 80.

**Pier 92: (Islais Creek) This site is not recommended for sitting the sensor.**

**South San Francisco Bay:****Redwood City:** (Wharf Five)

This site is would be co-located with the existing NOAA NWLON station. This site has an existing use agreement for the NOAA site and should allow the ease of upgrade to add the sensor at this location. The tide house at this location has AC power already installed, and the station DCP should allow the addition of the sensor to the suite of sensors. The location is across the pier from the Redwood City turning basin CMA.

**San Mateo:** (San Mateo Bridge)

This site was suggested for the channel approach to the bridge, during the visit to this site it was noted that there is an existing FAA meteorological station. That has visibility and cloud assessment capability, it was suggested that your port could look at the data from the existing site for guidance on visibility in this area. This would give you an indication of visibility in this area and could delay the need and provide input on conditions at this site.

**Carquinez Strait CMA:** (Benicia / Martinez - Amorco Pier)

**Martinez-Amorco Pier: (top choice due to ease of installation)**

This site is an existing SFO-PORTS location for a Side-looking current meter, and a separate meteorological station is co-located on this pier. A new tide house has been installed and AC power is readily accessed in this tide house. The tide house is closer than we would like for sitting the sensor however due to the described fog dynamics in this area its effect is lessened due to its position to the south of the sensor. The sensor could be mounted on the NE corner of the side-looker support deck. This would place the sensor over the water, and out of any operational area on this end of the pier.

**Benicia Pier: (Dock 1,2,3) (Dock site 2 second choice in this area.)**

Three sites at this location were visited; they are in close proximity, on the NW side of this pier. One was at a pier office installation (Dock 1 site) with easy access to power, with a deck surrounding the building. This building could influence the fog dynamics in this area. Another site (Dock 3 site) at the NW end of this pier was also considered again power access looks to be easy however this area is used for rescue boat operation, and has a good bit of equipment stored in this area. The dock 2 site is half way between the 1 and 3 sites. Power access looks to be close from a light located nearby, and the sensor would be set to look out over the water between the pier and shore. This would be just to the east of the CMA and at the inside of the turn.

## **Rio Vista, and North eastern SFO bay area.**

### **Rio Vista, Ca**

Two sites were visited here measurements we taken at one site.

**Rio Vista Draw bridge:** The Rio-Vista draw bridge was visited. Power and sitting look to be pretty straight forward however an agreement would need to be reached with CalTrans for access to mount the sensor and for power to the sensor. If contact with CalTrans about access to place Visibility sensors on the Richmond – San Rafael Bridge and the Oakland Bay Bridge abutments progresses this might be added into the discussion or used to start the discussion. Power requirements for the sensor are low, this issues is gaining access to AC power at these sites and working out an agreement that would allow the sensor to be mounted on CalTrans Property.

**USCG Station Rio Vista:** This site shows promise it is about one mile from the Rio Vista draw bridge along the Rio Vista approach CMA. Permitting, site access, and AC power should not be a big problem at this site though the sensor will take up some space along the rail of the pier that is used to access the boat docks it can be situated to impact pier operation as little as possible.

**Antioch:** A number sites were visited in this area none were really good for sitting the sensor. One site however that could not be visited at that time was the Kiecon pier just west from the Senator John A. Nejedly Bridge (Antioch Bridge) looks like it might be a prime site for locating the sensor. The Gaylord Container Company and the G-P Gypsum Dock are other alternatives. Mr Lopez, and Steinbrugge could arrange to visit these locations and access it for sitting the sensor. The former PG&E pier in Pittsburg, Ca is a close clone of the Antioch pier and sitting was discussed at a distance for that location and could correspond to this location.

**Pittsburg:** Like Antioch this site best location for a visibility sensor is the former PG&E pier there is currently a USCG VTS camera installation at this site. This site has new owners and I am missing my notes on who owns this pier. Again Mr Lopez and Steinbrugge have contacts for this site, and we have discussed sitting requirements for the sensor at this location from shore.