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STAFF REPORT: REGULAR CALENDAR

APPLICATION FILE NO.: **2-03-013**

APPLICANTS: **Seadrift Association and Kyra Ingemansson**

PROJECT DESCRIPTION: Replacement of the existing wooden bulkhead surrounding Seadrift Lagoon with steel sheet pile bulkhead.

PROJECT LOCATION: Seadrift Lagoon between Dipsea Road and Seadrift Road, Stinson Beach, Marin County

1.0 EXECUTIVE SUMMARY

The applicants propose to remove approximately 12,000 linear feet of deteriorating wooden bulkhead surrounding the Seadrift Lagoon and replace it with epoxy coated steel sheet piling. The applicants also propose to temporarily remove 80 private docks and replace portions of 144 decks that would be demolished during the construction process. The new bulkhead would be located landward of the existing bulkhead and would be vibrated to approximately 12 feet below the existing mudline. Staff recommends that the Commission **Approve** permit application 2-03-013 with conditions to prevent impacts to water quality.

2.0 STAFF RECOMMENDATION

The staff recommends conditional approval of Coastal Development Permit Application No. 2-03-013.

Motion: *I move that the Commission approve Coastal Development Permit Application No. 2-03-013, subject to the conditions specified below.*

Staff Recommendation of Approval

The staff recommends a YES vote. To pass the motion, a majority of the Commissioners present is required. Approval of the motion will result in the adoption of the following resolution and findings.

Resolution

The Coastal Commission hereby **grants** permit No. 2-03-013, subject to the conditions below, for the proposed development on the grounds that (1) the development is in conformity with the provisions of Chapter 3 of the California Coastal Act of 1976 and (2) there are no feasible alternatives or feasible mitigation measures other than those specified in this permit that would substantially lessen any significant adverse impact that the activity may have on the environment.

2.1 Standard Conditions

1. Notice of Receipt and Acknowledgment. The permit is not valid and development shall not commence until a copy of the permit, signed by the permittees or authorized agent, acknowledging receipt of the permit and acceptance of the terms and conditions, is returned to the Commission office.
2. Expiration. If development has not commenced, the permit will expire two years from the date on which the Commission voted on the application. Development shall be pursued in a diligent manner and completed in a reasonable period of time. Application for extension of the permit must be made prior to the expiration date.
3. Interpretation. Any questions of intent of interpretation of any condition will be resolved by the Executive Director or the Commission.
4. Assignment. The permit may be assigned to any qualified person, provided assignee files with the Commission an affidavit accepting all terms and conditions of the permit.
5. Terms and Conditions Run with the Land. These terms and conditions shall be perpetual, and it is the intention of the Commission and the permittees to bind all future owners and possessors of the subject property to the terms and conditions.

2.2 Special Conditions

1. Permit Required for Maintenance of Steel Sheet Piles

   Any future maintenance, including reapplication of Carboline 890 or another coating, would be subject to Commission review and authorization through either an amendment to this permit or a new coastal development permit pursuant to Coastal act Section 30610(d) and Section 13252(a) of Commission's regulations

2. Removal and Disposal of Debris.

   All loose materials and debris resulting from construction activities shall be removed from the lagoon in their entirety as soon as possible and shall be legally disposed of either outside of the Coastal Zone or inside the Coastal Zone in accordance with an approved coastal development permit.

3. Construction Staging

   Construction staging shall not occur outside the Seadrift Association parcel (APN 195-32-57) on the west side of the lagoon. Construction materials and equipment shall be stored in the upland areas of the parcel, inland of the existing wooden bulkhead, and shall not be stored the intertidal zone. Construction materials shall be stored on pallets, under cover and in secondary containment.

4. Sediment Control

   A. Construction shall occur during the lowest water level in Seadrift Lagoon that would still allow the barges to remain afloat.

   B. The new bulkhead shall be installed behind the existing bulkhead to contain sediment and turbidity.

   C. A silt curtain shall be placed around the existing, creosote-treated timber bulkhead during the installation of the new bulkhead and the removal of the existing bulkhead.

   D. ***Prior to commencement of any construction***, the eastern tide gate at Seadrift Lagoon shall be closed and remain closed for the duration of construction and for no less than four hours following the completion of construction each day activities authorized under this permit are carried out.

5. Chemical Control

   A. Wood treatment products and any other chemicals shall not enter waters of Seadrift Lagoon under any circumstances. Cutting and/or sawing of treated wood are prohibited within 50 feet of lagoon waters.

   B. Only wood pre-treated with EPA approved chemicals appropriate for this use shall be used for deck replacements that require treated wood. ***Prior to commencement of any construction***, the applicants shall provide certification from the supplier for any chemically treated lumber that the wood has been conditioned following treatment to minimize leaching of wood preservative chemicals in accordance with the *Best Management Practices for the Use of Treated Wood in Aquatic Environments, July 1996,* and any revisions thereto, developed by the Western Wood Preservers Institute.

6. Spill Prevention, Containment, and Cleanup Plan:

   A. Mobile fueling of construction equipment and vehicles is prohibited within Seadrift Lagoon.

   B. ***Prior to issuance of this Coastal Development Permit***, the applicants shall submit for review and written approval by the Executive Director a detailed plan to prevent, contain, and cleanup any fuel, oil, or hazardous material spills. At a minimum, the plan shall describe the spill equipment to be stored at the project site and on all the barges during construction and the measures to be taken should a spill occur.

   C. The applicants shall undertake development in accordance with the approved plans. Any proposed changes to the approved plans shall be reported to the Executive Director. No changes to the approved plans shall occur without a Commission amendment to this CDP unless the Executive Director determines that no amendment is legally required.

7. Property Owner's Permission to Undertake Development

   Consistent with Section 30601.5 of the Coastal Act, this permit only authorizes development on property upon which the landowner has expressly granted permission to carry out the development as approved and conditioned by the Commission.

3.0 FINDINGS AND DECLARATIONS

The Commission hereby finds and declares as follows:

3.1 Project Location

The project site, located on the filled portion of the sand spit between Dipsea Road and Seadrift Road in Stinson Beach, Marin County, entails the entire perimeter of the Seadrift Lagoon, within the private, gated community of Seadrift (Exhibit 1, Vicinity Map & Exhibit 2, Project Location Map). Seadrift Lagoon is an artificially created interior lagoon located between Dipsea and Seadrift Roads and is hydrologically connected to Bolinas Lagoon via two tide gates (Exhibit 3, Tide Gates Location Map). The western tide gate consists of two 36" inlet pipes; a single 24" outlet pipe makes up the eastern tide gate. The tide gates are controlled by the Seadrift Association via flap gates to maintain water levels in the Seadrift Lagoon. The waters of Seadrift Lagoon are part of the Gulf of the Farallones National Marine Sanctuary.

For all of the properties fronting the Seadrift Lagoon, an existing wooden bulkhead separates the lagoon from the landward portion of the properties. The bulkhead, installed around 1965, is approximately three feet high (it is unknown how deep the vertical posts are driven into the lagoon's bottom) and consists of creosote treated wooden posts and lagging (Exhibit 5, Site Photograph). The replacement is deemed necessary as extensive deterioration and rotting have occurred throughout the entire Seadrift bulkhead due to the corrosive saltwater environment.

3.2 Project History

In 2002, five Seadrift residents with properties adjacent to the lagoon applied for a coastal development permit (CDP No. 2-02-001) to replace 410 feet of deteriorating wooden bulkhead on their properties with PVC sheet piling. The Commission continued the hearing on the project at the October 2002 meeting due to concerns regarding human health and water quality impacts from PVC. The applicants then withdrew their CDP application because the Seadrift Association had decided that the entire bulkhead needed replacement and that a suitable material other than PVC would be proposed in response to the concerns regarding the PVC material.

The proposed project is the result of consensus reached by 178 of the 179 property owners surrounding Seadrift Lagoon who have given their permission to allow the Seadrift Association and the engineering consultant, Ron Noble, to represent them and submit this application on their behalf. One of the owners of property fronting Seadrift Lagoon, Kyra Ingemansson, did not allow the Seadrift Association or Ron Noble to act as her agent, but has signed onto the application as a co-applicant. However, she opposes the proposed use of the epoxy coated steel sheet piling due to the potential environmental impacts that would result from the maintenance of the bulkhead with the epoxy coating. Ms. Ingemansson has indicated that she would prefer the bulkhead to be replaced with untreated wood and has provided information about various tropical hardwood species that are naturally resistant to deterioration from use in a marine environment. The potential water quality impact of the proposed project, including the concerns raised by Ms. Ingmansson regarding the epoxy coating on the steel sheet piling, Carboline 890, is addressed in the Water Quality section below.

At this point it is unclear whether Ms. Ingemasson would remain as a co-applicant. If she remains as a co-applicant, the development would be carried out on her property as approved and conditioned by the Commission, however, should she withdraw her property from this application, the proposed development would not be allowed to be carried out on her property pursuant to Section 30601.5 of the Coastal Act. Due to the numerous property owners involved in the proposed development, and to clarify where the development as approved and conditioned by the Commission can be undertaken consistent with Section 30601.5 of the Coastal Act, **Special Condition 7** clarifies that the proposed development may only take place on properties upon which the landowner has expressly granted permission to carry out the development as approved and conditioned by the Commission.

3.3 Project Description

The applicants propose to remove the existing timber bulkhead lining the rim of the Seadrift Lagoon which totals approximately 12,000 linear feet, and replace it with an epoxy coated steel sheet pile bulkhead. To accommodate the construction of the bulkhead, the applicants are also proposing to temporarily remove 80 private docks before construction and replace them in the same location after the bulkhead is completed and to replace portions of 144 decks that would need to be demolished for construction. The removed docks would be placed on their owners' property during construction and the removed decking material would be disposed offsite.

The replacement bulkhead would be placed landward of the existing wooden bulkhead. The bulkhead would be constructed with interlocking 1'x18' epoxy coated steel sheet piles topped with a 4-inch thick timber cap and timber side walers (Exhibit 4, Project Plans). Specifically, Carboline 890 would be used to coat the steel sheet piles, which the Commission, in consultation with California Department of Fish and Game, approved for a previous bulkhead project in the Bolinas Lagoon (CDP No. 1-97-58). Carboline 890 was found by the Commission to be an acceptable epoxy coating based on its low potential for toxin leaching and low content of epoxy resins. The timber cap and walers, located on top of the sheet piling, above water level, would be pressure treated with alkaline copper quaternary (ACQ), which does not contain arsenic, chromium or other EPA-classified hazardous preservatives or carcinogens. The design life of the bulkhead is estimated to be at least 50 years with zero maintenance. The treated timber caps and walers are expected to have a design life of 25 years.

The construction process would include three general steps. First, the private docks and decks would be removed from the landside. Next, the new bulkhead would be installed behind the existing timber bulkhead. Finally, the existing bulkhead would be removed and the docks and decks replaced.

There are currently 80 private docks in the Seadrift Lagoon and 144 decks that extend landward from the existing bulkhead to the residents' properties. As mentioned above, the 80 docks would be placed on their owners' properties during construction. The applicants estimate that for each deck approximately two to three feet of decking would need to be demolished to make room for the installation of the new bulkhead.

Both the removal of the existing and installation of the new bulkhead would be performed using two portable pontoon barges, approximately 20'x40' in size, which would be towed by skiffs. For the installation, one pontoon would support an excavator with a light vibro head and hydraulic power pack that would vibrate the new sheet piles into place. The second pontoon barge would be a service float that would transfer new sheet piles from the staging area to the

installation area. To remove the existing bulkhead, an excavator with a sling attachment would be used on one float to extract the bulkhead vertically and place it onto the second barge. The second barge would transport the bulkhead pieces to a staging area where a small landside crane would be used to load the demolished materials to a truck destined for a disposal site.

After removal of the existing timber bulkhead, docks that have been removed would be placed back in their original location and portions of decks that have been demolished to allow for construction would be replaced from the landside using the same material type that was removed, on a lot per lot basis. Where treated timber was removed, such as sub-deck structural material, a suitable and approved material, and/or treatment preservatives that does not have adverse impacts to human health, water quality, and biological resources would be used instead.

A vacant lot owned by the Seadrift Association located at the western end of the Seadrift Lagoon on Dipsea Road (Exhibit 5, Location of Seadrift Association Lot) would be used as the construction staging area where all equipment and materials would be stored. The lot is an approximately 100'x100' parcel consisting mostly of sand with some ground cover vegetation on two sides.

Approximately 10 months would be needed to complete the proposed development with construction taking place between 8AM to 5PM on weekdays. The proposed project construction would add 16 week day car trips by the construction crew to the local roads over a 10 month period. The proposed project would also generate one to two semi-truck trips per day for 90 days and one or two dump truck trips every 10 days for 150 week days.

The applicants are proposing to implement the following measures to minimize impacts to water quality and contain any accidental hazardous waste spill:

- Construction would occur during the lowest water level that would still allow the barges to remain afloat.
- The new bulkhead would be installed behind the existing bulkhead to contain sediment and turbidity.
- A silt curtain would used by the contractor in areas where the existing bulkhead is so deteriorated that it cannot act as a sufficient barrier to contain and minimize turbidity and suspension of sediment during the installation of the steel pile bulkhead.
- A silt curtain would be placed around the existing, creosote-treated timber bulkhead during the removal process. Any loose debris that would result from the extraction and removal of the existing bulkhead would be removed immediately.
- The applicants' contractor would submit a hazardous spill containment plan for Commission approval before construction begins.
- The applicants' contractor would have necessary spill prevention and containment equipment on board all of the barges during construction.

3.4 Coastal Act Issues

3.4.1 Water Quality

Coastal Act Section 30230 states:

> *Marine resources shall be maintained, enhanced, and where feasible, restored. Special protection shall be given to areas and species of special biological or economic significance. Uses of the marine environment shall be carried out in a manner that will sustain the biological productivity of coastal waters and that will maintain healthy populations of all species of marine organisms adequate for long-term commercial, recreational, scientific, and educational purposes.*

Coastal Act Section 30231 states:

> *The biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health shall be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of ground water supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams.*

Seadrift Lagoon is an artificially created lagoon that is approximately 5,500 feet long by 150 to 550 feet wide and is relatively shallow, with a maximum depth of approximately 6 feet. The lagoon is used for non-motorized, recreational boating and swimming by members of the Seadrift community only. Natural beach sand deposits underlie the southern portion of the lagoon and much of the land along the north side of Seadrift Lagoon was created by placing sandy fill that was excavated to create the lagoon. The entire lagoon is surrounded by existing single-family, detached, residential housing accessed from Seadrift and Dipsea Roads. Seadrift Lagoon is considered to have three types of habitat: 1) upland habitat, which is not usually covered by water at high tide; 2) inter-tidal habitat, which is exposed to low tide but covered by water at high tide; and 3) sub-tidal habitat, which is always under water. The rear yards of the single-family homes are the established upland habitat area; beyond the existing bulkhead is the inter-tidal and sub-tidal habitat.

A 2003 field reconnaissance and literature search of the species and habitat of Seadrift Lagoon by biological consultant L.A. de Wit shows that the lagoon does not support any special-status species or sensitive habitats, including eelgrass beds, and concludes that "the lagoon macroepibiota is relatively depauperate and characterized by mussels, sponges, and other invertebrates that were most commonly observed attached to the existing bulkhead and floats." The report also states that staff from Point Reyes Bird Observatory indicated that while various species of birds use Seadrift Lagoon due to its adjacency to Bolinas Lagoon, it is not known to be a critical habitat for any avifauna or support any threatened or endangered bird. As such, the Seadrift Lagoon would not be considered an area of special biological significance.

Unlike Seadrift Lagoon, Bolinas Lagoon, located immediately to the north, is considered a biologically significant and environmentally sensitive habitat. The two lagoons are physically separated by the sand spit and residential development on the north side of Seadrift Lagoon, but are hydrologically connected by two existing tide gates located at the eastern and western ends of Seadrift Lagoon. The tide gates are controlled by the Seadrift Association to maintain a certain water level in Seadrift Lagoon. When the tide gates are open, water from Bolinas Lagoon flows

into Seadrift Lagoon via the western tide gate and water from Seadrift Lagoon flows into Bolinas Lagoon through the eastern tide gate.

Bolinas Lagoon is within the Gulf of the Farallones National Marine Sanctuary, one of four national marine sanctuaries in California and one of thirteen in the nation. The Sanctuary was designated in 1981 to protect and manage the 1,255 square miles encompassing the Gulf of the Farallones, Bodega Bay, Tomales Bay, Drakes Bay, Bolinas Bay, Estero San Antonio, Estero de Americano, Duxbury Reef, and Bolinas Lagoon. The approximately 2.2-square-mile (1,400-acre) Bolinas Lagoon contains environmentally sensitive habitat, including wetland and mudflats. Bolinas Lagoon provides an important haul-out and birthing site for harbor seals. In addition, benthic invertebrates and fish in the lagoon support a great diversity and abundance of wintering and migratory shorebirds, waterfowl, gulls, and other water-associated birds (Marin County LCP 1981). Bolinas lagoon is the only designated "Wetland of International Significance" on the Pacific Flyway as determined by the Convention on Wetlands of International Importance in 1998, and was recognized particularly for its waterfowl habitat. Approximately 245 species of birds have been identified at the Lagoon and its surrounding watershed. Twenty-three of these species are considered rare, threatened, or endangered. Shorebirds and waterbirds such as the brown pelican, snowy plover, dunlin, great blue heron, black crowned night heron, willet, sandpiper, and greater sand plover have been observed on the lagoon. Heron and egret are known to nest in the lagoon. Of the fifty or so estuaries that have formed along the Pacific Coast, Bolinas Lagoon is one of only 13 that sustains large numbers of migratory shorebirds. Furthermore, the Bolinas Lagoon Management Plan prepared by Marin County in 1996 also identified three species each of amphibians and mammals that frequent Bolinas Lagoon as rare, threatened or endangered (Bolinas Lagoon Ecosystem Restoration 2001). Marin County designates Bolinas Lagoon as a County Nature Preserve. The U.S. Army Corps of Engineers found that Bolinas Lagoon is part of a larger natural habitat complex that is part of or adjoins the Sanctuary, encompassing the Pt. Reyes National Seashore, Golden Gate National Recreation Area, Central California Coast Biosphere Preserve, Mt. Tamalpais State Park, and the Audubon Canyon Ranch Bird Sanctuary (USACOE 1997).

Coastal Act Section 30230 requires that marine resources be maintained, enhanced, and where feasible, restored and provides special protection to areas and species of special biological or economic significance. Coastal Act Section 30231 further requires that the biological productivity and the quality of coastal waters, streams, wetlands, estuaries, and lakes appropriate to maintain optimum populations of marine organisms and for the protection of human health be maintained and, where feasible, restored through, among other means, minimizing adverse effects of waste water discharges and entrainment, controlling runoff, preventing depletion of groundwater supplies and substantial interference with surface water flow, encouraging waste water reclamation, maintaining natural vegetation buffer areas that protect riparian habitats, and minimizing alteration of natural streams. The Commission considers Bolinas Lagoon to be a unique and important coastal wetland and finds that any development proposed within the connected Seadrift Lagoon must be undertaken to avoid impacts that would significantly degrade the biological productivity and quality of these connected coastal waters and wetlands. Furthermore, Seadrift community members use Seadrift Lagoon for recreational swimming and non-motorized boating. Thus, it is important that the proposed project protect human health of recreational users of these waters consistent with Section 30231.

3.4.1.2 Water quality impacts from epoxy coating

The applicants are proposing to use epoxy (Carboline 890) coated steel sheet piles to replace the existing wooden bulkhead. Epoxy is a common protective coating applied to a number of structures in the marine environment to enhance durability and resistance against chemical and physical corrosion. The Commission has approved a variety of marine structures using epoxy coated steel, including support piles for offshore bird platforms (CDP No E-04-010), dock pilings (CDP Nos. 5-04-103 and 5-04-169), and bulkheads. As mentioned above, the Commission has previously approved a steel bulkhead coated with Carboline 890 for use in Bolinas Lagoon (CDP No. 1-97-58). Carboline 890 is a two-component, industrial epoxy system whereby the epoxy resin and the curing agent are packaged separately and must be mixed together just before being used. Based on the Material Safety Data Sheet (Exhibit 6), each component contains hazardous materials including silica, the epoxy resin itself, and volatile organic compounds (VOCs) such as benzene, xylene, and toulene. However, once the components are combined and given proper time to cure and harden, the active chemicals become inert and would no longer pose a significant risk to human health or marine life. The California Department of Health Services states, "The hardened, finished [epoxy] polymers are almost non-toxic; it is exposure to the uncured resin components that can be harmful" (Exhibit 7, Epoxy Resin Systems Fact Sheet)

Since the proposed development would install steel sheet piles pre-treated with the Carboline 890 coating, meaning that the epoxy would have been properly applied and cured by the manufacturer before being shipped to the construction site, there would not be a significant potential for toxins in the epoxy to leach into Seadrift Lagoon and adversely affect marine resources or the quality and biological productivity of the coastal water. The only significant opportunity for Carboline 890 to present any risk to the water quality and marine organisms of Seadrift Lagoon would be during any future bulkhead maintenance activity that required the reapplication of Carboline 890 to the bulkhead in situ. Application of the coating in situ would present a risk of water quality impacts through accidental spills, overspray, and water contact with uncured coating. This is the chief concern raised by Ms. Ingmansson. The manufacturer of the steel sheet piling estimated that based on the thickness of the steel (0.22 inches) and epoxy coating (two coats of 8 mils[1] each would be applied) the design life of the epoxy coated steel bulkhead would be at least 50 years with zero maintenance (Exhibit 8, June 21, 2005 Letter from International Construction Services to Ron Noble). Periodic maintenance could prolong the design life, but in any case, the proposed bulkhead would eventually deteriorate due to corrosion by the saltwater environment. As specified in **Special Condition 1**, any future maintenance, including reapplication of Carboline 890 or another coating, would be subject to Commission review and authorization through either an amendment to this permit or a new coastal development permit pursuant to Coastal act Section 30610(d) and Section 13252(a) of Commission's regulations. The impacts of such future maintenance activities would be reviewed for conformity with the resource protection policies of the Coastal Act at the time that such maintenance is proposed. Moreover, epoxies that contain fewer toxins and no VOCs are currently available and could be used for future maintenance of the bulkhead, should that need arise, to reduce the potential for water quality impacts associated with such maintenance activities.

[1] 1 mil = 1/1000 inch

Because the epoxy coating on the steel sheet piles would be cured and hardened before arriving at the project site, VOCs and other toxins from the epoxy would not have a significant potential to leach into Seadrift Lagoon and cause significant adverse impacts to the biological productivity and quality of coastal waters, the Commission therefore finds that the proposed development is consistent with Coastal Act Sections 30230 and 30231.

3.4.1.3 Construction and copper sulfate related water quality impacts

The proposed project would support the goals of Sections 30320 and 30231 because it would remove the existing creosote treated wooden bulkhead and replace it with more durable and less environmentally damaging materials. Creosote, a chemical used to prevent the deterioration of wood by wood-boring organisms, is obtained by the distillation of coal tar and is primarily made up of a mixture of chemicals called polycyclic aromatic hydrocarbons (PAHs). PAHs can potentially leach out of the bulkhead and into the water column where they can be absorbed by fish and other aquatic organisms with potentially adverse consequences.

The applicants propose to replace the existing creosote treated timber bulkhead with epoxy coated sheet pile armor topped with wooden cap and walers treated with ACQ. As discussed above, unlike creosote, the epoxy coating that would be used to treat the steel sheet piling would be in its cured, almost non-toxic condition and would have a significantly lower potential of leaching toxins into the water. As for the proposed use of treated wood, the timber cap and walers would sit on top of the bulkhead above the water level, and would not be immersed in the lagoon water, and therefore, any treatment chemicals in the wood would have a lower potential of leaching into the water. Also, unlike other commonly used wood treatment products such as ammoniacal copper zinc arsenate (AZCA), ammoniacal copper arsenate (ACA), and chromated copper arsenate (CCA), ACQ does not contain any arsenic, chromium, or other EPA classified toxic substances or carcinogens. The wood would be pressure treated with ACQ by the manufacturer before being used at the construction site and would therefore not require any onsite treatment that could contaminate the lagoon water. Moreover, the expected design life of the new steel bulkhead is at least 50 years with zero maintenance, which would be longer than the existing wooden bulkhead that lasted approximately 40 years before requiring complete replacement.

The proposed development would also enhance the water quality of Seadrift Lagoon because it would prevent the erosion of sediments from the surrounding parcels into the lagoon. Presently, many sections of the bulkhead have deteriorated to such an extent that there is no separation between the soil and the water (Exhibit 9, Site Photograph). This sediment has the potential to continue to erode into the lagoon. Replacing the bulkhead would prevent further erosion of the properties surrounding the lagoon.

The proposed development would result in overall improvement to water quality and biological productivity through the removal of creosote treated wood and prevention of erosion; however, if creosote treated wooden debris, or other construction materials were introduced into Seadrift Lagoon during the bulkhead removal and installation process, it may impact the water quality and biological productivity of the project area, inconsistent with Section 30231.Therefore, **Special Condition 2** requires all construction materials and debris to be removed from the lagoon, and requires disposal of all materials outside of the Coastal Zone unless authorized within the Coastal Zone under an approved coastal development permit.

As the proposed staging area would be located directly adjacent to the lagoon, the potential exists for construction material and other debris to enter the lagoon, which would adversely affect water quality and marine organisms. To protect water quality and prevent construction materials or debris from entering the ocean during construction, **Special Condition 3** requires the applicants to store construction material above the intertidal area and to contain construction material and debris to prevent them from entering coastal waters.

Another potential impact to water quality would be from the copper sulfate found in the sediment of Seadrift Lagoon. For 15 to 20 years, ending in 1986, copper sulfate was used to manage algae growth and blooms in Seadrift Lagoon. Although this practice has been stopped, contaminants are still present within the sediment. The U.S. Army Corps of Engineers conducted a study of the copper sulfate levels in the both Seadrift and Bolinas Lagoons during 1999. The samples taken at Seadrift Lagoon showed levels for copper of 12.2-mg/dry kg at the surface and 7.39-mg/dry kg at the bottom. The samples also showed sulfide levels of 22-mg/dry kg at the surface and 3-mg/dry kg at the bottom. The sediments sampled in Bolinas Lagoon showed copper concentrations averaging 9.1-mg/dry kg at the surface and 11.9-mg/dry kg at the bottom and total sulfide concentrations averaging 33.3-mg/dry kg at the surface and 47.7-mg/dry kg at the bottom.

At present, the National Oceanic Atmospheric Administration (NOAA) unofficially uses a value of 34-mg/dry kg as the level of Effects Range-Low (ER-L) for copper concentration in the sediment. Copper concentrations in the sediment below ER-L are not likely to have adverse effects on benthic organisms. The Dredge Material Management Office (ACOE-SF) also unofficially uses 68-mg/dry kg as an "action or review level."[2] When examining dredging projects, any data above that point is considered in the overall risk assessment for a dredging project. Below that level, it is generally ignored. The copper levels the Corps observed in Seadrift Lagoon were lower than both the NOAA (34-mg/dry kg) and DMMO (68-mg/dry kg) numbers.

The Corps does not have any summary data available for totals sulfides, but noted that much higher levels in dredged materials have been observed in studies conducted for the Corps. In those studies total sulfides ranged from over 400 to over 1100 mg/kg and no biological effects were documented. The report states that sulfides generally have a low toxicity since they are normally bound in an insoluble form as a sulfate with various metals. The DMMO has eliminated total sulfides from the list of analytes since it has not been shown to influence toxicity in dredge material testing.[3] Even though copper sulfate is soluble in water, it binds strongly to sediment. Therefore, its leaching potential is low.

The applicants are proposing activities that would disturb the sediment and may suspend sediments in the water column. As mentioned above, the eastern tide gate allows water from Seadrift Lagoon to flow into Bolinas Lagoon. Sediments suspended in the water column at a time when the eastern tide gate is open could migrate to Bolinas Lagoon. Although the copper and sulfide levels sampled by the Corps in the Seadrift Lagoon are not especially high, and the

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[2] The Dredge Materials Management Office is a joint program of the San Francisco Bay Conservation and Development Commission (BCDC), San Francisco Bay Regional Water Quality Control Board (RWQCB), State Lands Commission (SLC), the San Francisco District U.S. Army Corps of Engineers (COE), and the U.S. Environmental Protection Agency (EPA).

[3] Analytes are the substances being measured in an analytical procedure.

applicants are proposing to use silt curtains during construction, there is a possibility that the proposed development would increase the levels of copper sulfate within Bolinas Lagoon, which may cause significant adverse effects to the marine resources and water quality of Bolinas Lagoon inconsistent with Sections 30230 and 30231. Therefore to prevent the migration of copper sulfate from Seadrift Lagoon to Bolinas Lagoon, **Special Condition 4** requires that the applicants implement sediment control measures including the use of silt curtains during both the installation and removal of the bulkhead and closing the eastern tide gate during construction and for no less than four hours following the completion of construction for each day of activities authorized under this permit. Four hours represent sufficient time for any sediments disturbed during construction activities to settle as the lagoon is relatively shallow and the sediment would consists mostly of larger sized, sandy particles (as the lagoon bottom is lined with beach sand) that does not take a significant amount of time to settle back to the lagoon floor. In addition, the use of silt curtains would contain the suspended sediments and reduce their potential to disperse throughout Seadrift Lagoon and into Bolinas Lagoon.

Finally, wood treatment chemicals could potentially cause adverse impacts to water quality. The applicants have proposed to use wood pre-treated with ACQ for the timber cap and walers on top of the new steel bulkhead. The wooden cap and walers would not be immersed in the lagoon water, which lowers the potential of wood treatment chemicals leaching into the lagoon. Also, ACQ does not contain any EPA classified hazardous substances or carcinogens and the wood would not require any onsite treatment. However, improper treatment of the wood prior to arrival at the project site could cause wood treatment chemicals to leach into the water, especially during storms, and therefore, to minimize leaching of any wood preservative chemicals, **Special Condition 5** requires that the applicants provide certification from the supplier that the wood has been conditioned following treatment to minimize leaching in accordance with the *Best Management Practices for the Use of Treated Wood in Aquatic Environments, July 1996,* and any revisions thereto, developed by the Western Wood Preservers Institute. In addition, cutting the lumber onsite could cause sawdust and other woody debris treated with chemical preservatives to enter the water, and as such, **Special Condition 5** prohibits the cutting or sawing of any treated lumber within 50 feet of lagoon waters. Finally, while the applicants propose to replace any decking material consisting of treated wood with an environmentally sound alternative, they have not identified the specific material. To avoid the necessity of onsite wood treatment and the risk of spilling wood treatment chemicals into lagoon waters, **Special Condition 5** further requires that only wood pre-treated with EPA approved chemicals be used to replace decks originally constructed of treated wood.

Thus, the proposed project as conditioned will protect the biological productivity and the quality of coastal water and wetlands so as to maintain populations of marine organisms and protect human health of recreational users of these waters by removing creosote treated wood and stopping erosion along the banks of Seadrift Lagoon, as well as preventing impacts to coastal water quality from construction related debris, migration of contaminated sediments into Bolinas Lagoon, and introduction of wood treatment chemicals into coastal waters. Therefore, the Commission finds that as conditioned the proposed project is consistent with Sections 30230 and 30231 of the Coastal Act.

3.5 Oil and Fuel Spills

Coastal Act Section 30232 states:

> *Protection against the spillage of crude oil, gas, petroleum products, or hazardous substances shall be provided in relation to any development or transportation of such materials. Effective containment and cleanup facilities and procedures shall be provided for accidental spills that do occur.*

As proposed, the project requires the use of an excavator, skiffs to tow the barges, and trucks that bring equipment and construction material to the site and haul away debris. These equipment would use and store diesel fuel, oil, and petroleum products in tanks near and on Seadrift Lagoon. Coastal Act Section 30232 requires that protection against the spillage of crude oil, gas, petroleum products, or hazardous substances be provided in relation to any development or transportation of such materials and that effective containment and cleanup facilities and procedures be provided for accidental spills. Although unlikely, the potential exists for an accidental spill of diesel fuel or oil. To reduce the potential for fuel spills, **Special Condition 6** prohibits the fueling of construction equipment on the Seadrift Lagoon. If a spill were to occur, pursuant to **Special Condition 4,** the eastern tide gate at Seadrift Lagoon would be closed, which would facilitate the containment of the spill. Although closure of the eastern tide gate would lessen the spread of the spill, additional precautionary measures are needed to protect against spills and ensure the effective containment and cleanup of a spill if one were to occur. Therefore, **Special Condition 6** also requires the applicants to submit a spill prevention, containment and cleanup plan for review and approval by the Executive Director. This plan must include a detailed description of spill prevention, containment, and cleanup equipment to be maintained on site and on the barges, the measures that would be implemented to prevent, contain, and clean up any spills, and contact information for responding to spills. The Commission finds that with these conditions in place, the proposed project is consistent with Coastal Act Section 30232.

3.6 Public Access

Section 30211 of the Coastal Act states:

> *Development shall not interfere with the public's right of access to the sea where acquired through use or legislative authorization, including, but not limited to, the use of dry sand and rocky coastal beaches to the first line of terrestrial vegetation.*

Section 30211 of the Coastal Act prohibits development that would interfere with the public's right of maximum access to the sea. Seadrift is a private, gated community established before the Coastal Act. Seadrift Lagoon is a part of that community and is an artificially created lagoon available for the exclusive use of Seadrift community members. As such, any disruption in access and use of the lagoon by the proposed development would not be considered an interference of public access because the lagoon is not available for public use. Traffic impacts from construction activities could potentially interfere with access to the public beaches in the area, especially the popular Stinson Beach State Park. Travel by the construction crew would generate approximately 16 vehicle trips per workday throughout the duration of construction, and construction activities would require one to two semi-truck trips per day for 90 days and one

or two dump trick truck trips every 10 days for 150 days. However, all of these vehicle trips would occur on weekdays only, and the area's road experiences heavy traffic mostly on weekends, therefore, the proposed development would not create additional demand on the roads during its peak use times and would not interfere with the public's ability to access the shoreline.

Since the proposed development would not disrupt public use of Seadrift Lagoon as it is not part of a public shoreline, and would not create significant traffic impacts that would interfere with public's ability access to the area's beaches, the Commission finds that the proposed project is consistent with Section 30211 of the Coastal Act.

3.7 California Environmental Quality Act (CEQA)

Section 13096 of the California Code of Regulations requires Commission approval of Coastal Development Permit applications to be supported by a finding showing the application, as conditioned by any conditions of approval, to be consistent with any applicable requirements of the California Environmental Quality Act (CEQA). Section 21080.5(d)(2)(A) of CEQA prohibits a proposed development from being approved if there are feasible alternatives or feasible mitigation measures available, which would substantially lessen any significant adverse effects, which the activity may have on the environment.

The Commission incorporates its findings on Coastal Act consistency at this point as if set forth in full. The staff report addresses and responds to all public comments regarding potential significant adverse environmental effects of the project that were received prior to preparation of the staff report. The proposed project has been conditioned to be found consistent with the policies of the Coastal Act and to minimize all adverse environmental effects. Mitigation measures have been imposed to prevent impacts to water quality. As conditioned, there are no feasible alternatives or feasible mitigation measures available, beyond those required, which would substantially lessen any significant adverse impacts, which the development may have on the environment. Therefore, the Commission finds that the proposed project can be found consistent with Coastal Act requirements to conform to CEQA.

EXHIBITS:

1. Vicinity Map
2. Project Location Map
3. Location of Tide Gates Map
4. Project Plans
5. Location of Seadrift Association lot
6. Carboline 890 Material Safety Data Sheet
7. California Department of Health Services, Fact Sheet on Epoxy Resin Systems
8. June 21, 2005 Letter from William Carp of International Construction Services to Ron Noble
9. Site Photographs

REFERENCES

L.A. deWit Consultants, *Marine Biological Assessment of the Seadrift Lagoon Bulkhead Replacement*, February 13, 2003.

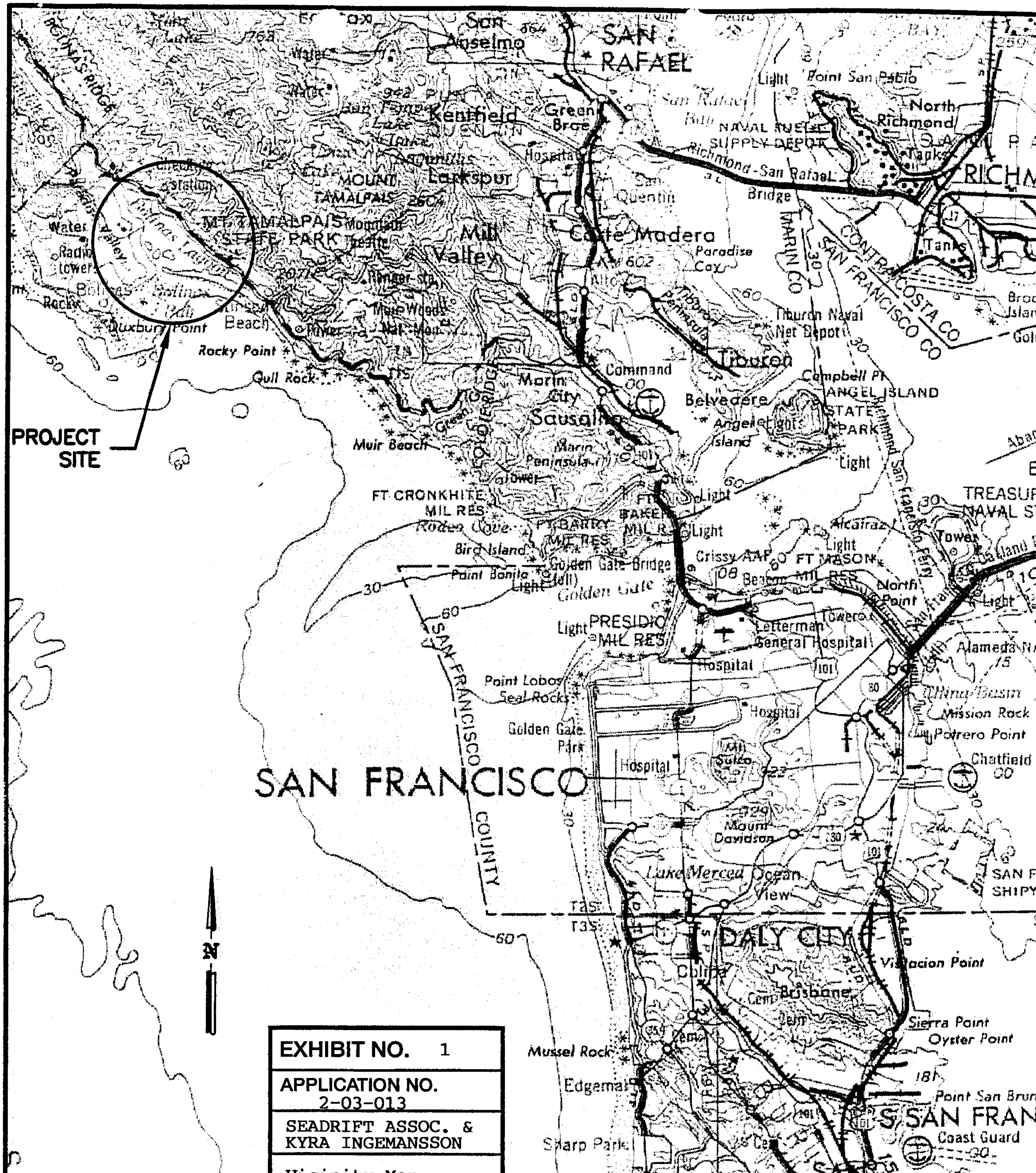


EXHIBIT NO. 1
APPLICATION NO. 2-03-013
SEADRIFT ASSOC. & KYRA INGEMANSSON
Vicinity Map

3 0 3

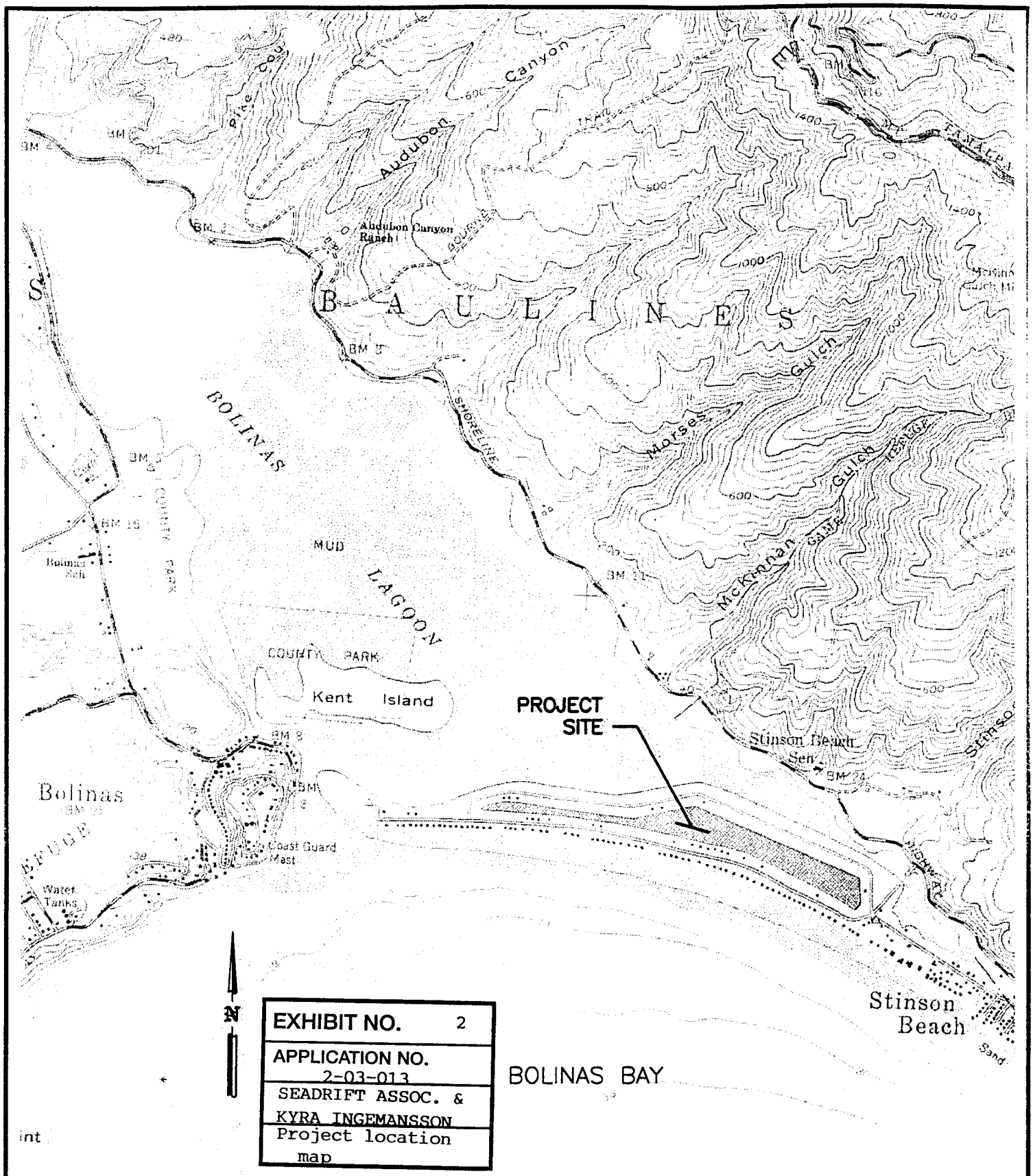
SCALE MILES

SOURCE: USGS, "SAN FRANCISCO, CALIFORNIA"

Vicinity Map

NOBLE CONSULTANTS, INC.

Figure 1



N

EXHIBIT NO. 2
APPLICATION NO. 2-03-013
SEADRIFT ASSOC. & KYRA INGEMANSSON
Project location map

2,000 0 2,000

SCALE FEET

Site Location

SOURCE: USGS, "BOLINAS, CALIF."

NOBLE CONSULTANTS, INC.

Figure 2

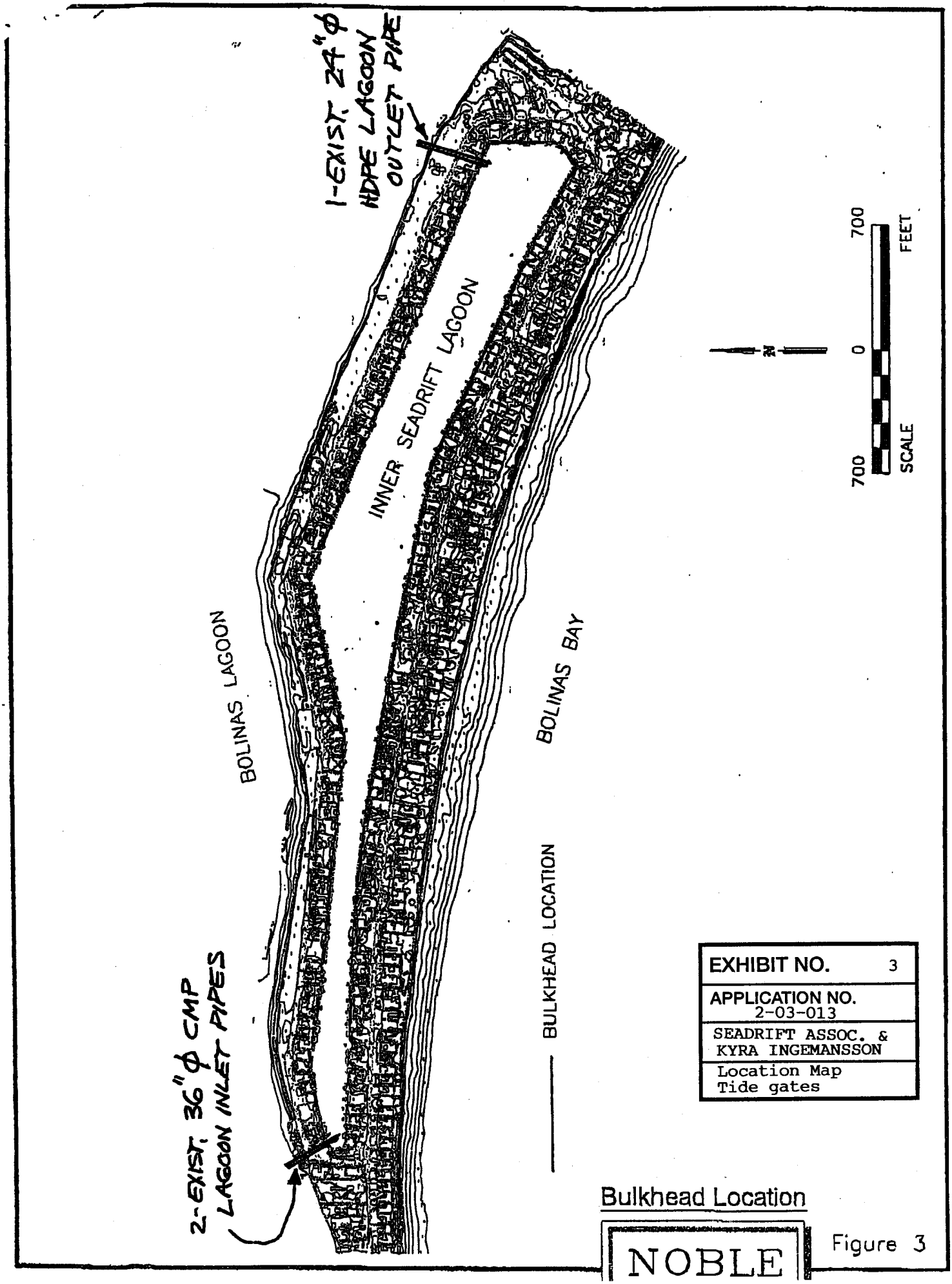
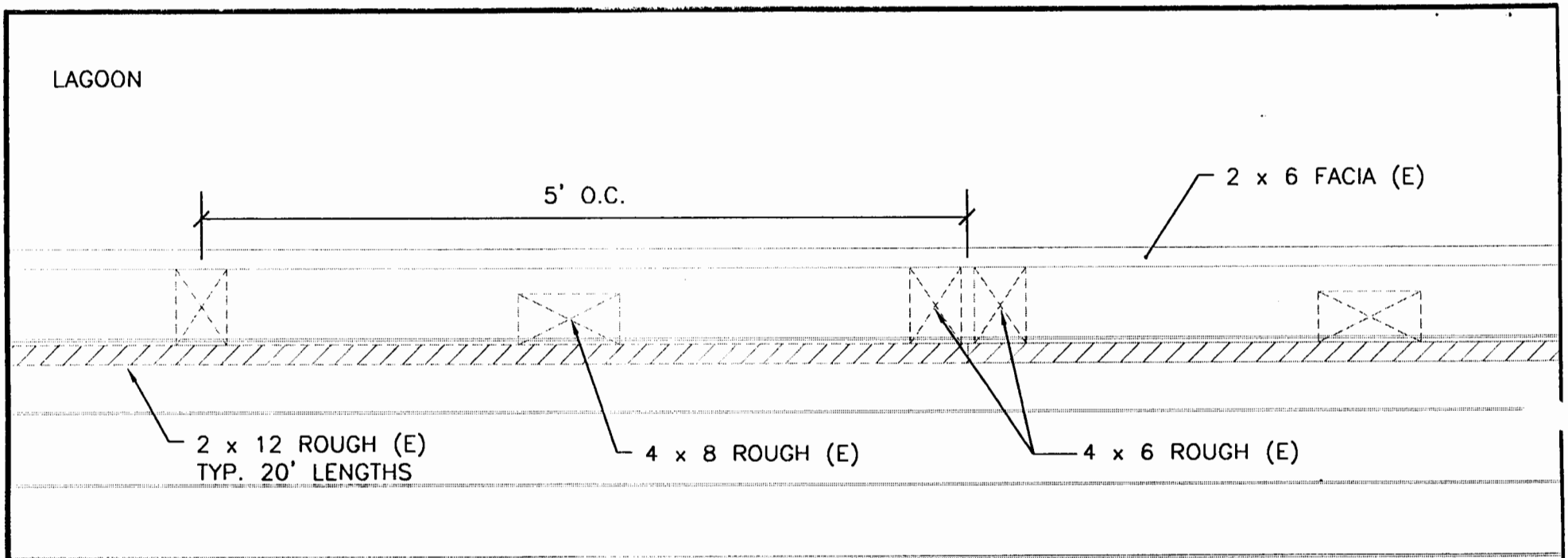


EXHIBIT NO. 3
APPLICATION NO. 2-03-013
SEADRIFT ASSOC. & KYRA INGEMANSSON
Location Map Tide gates

Bulkhead Location

NOBLE

Figure 3



Plan - Existing Bulkhead

Figure 4

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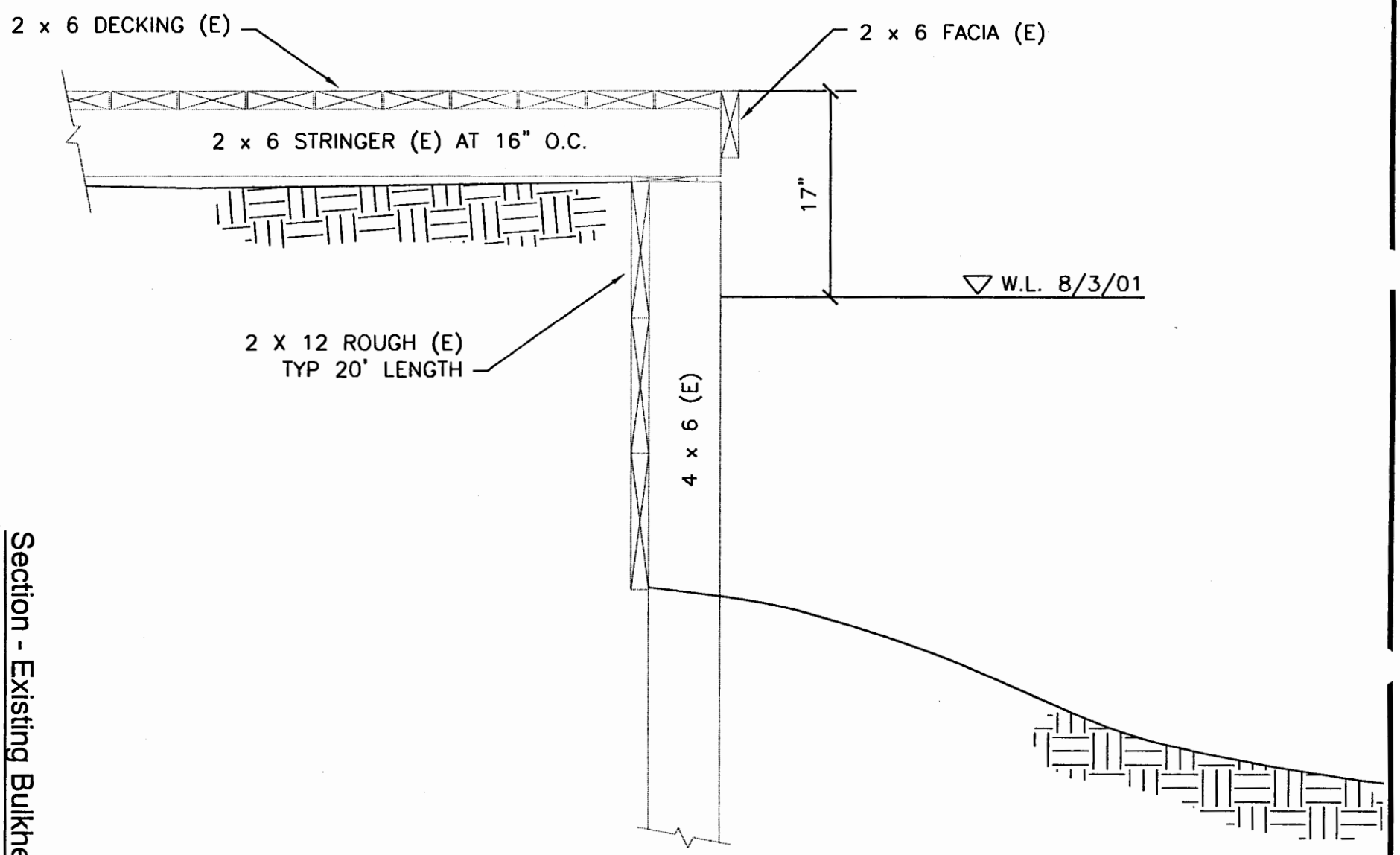
EXHIBIT NO. 4
APPLICATION NO. 2-03-013
SEADRIFT ASSOC. & KYRA INGEMANSSON
Project Plans (Page 1 of 5)

1 0 1

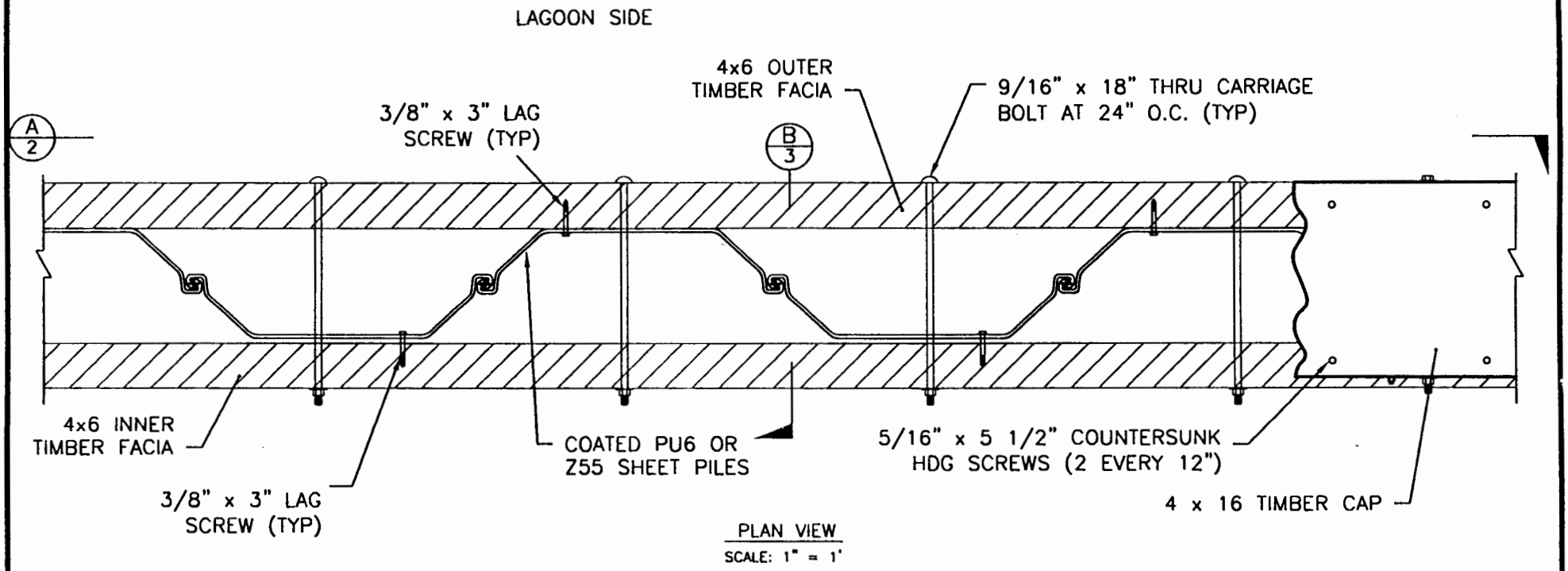
SCALE FEET



Section - Existing Bulkhead

NOBLE CONSULTANTS, INC.

Figure 5



STEEL SHEET PILE NOTES:

1. STEEL SHEET PILES SHALL BE ARBED PU-6 (AS SUPPLIED BY SKYLINE STEEL) OR CMRM Z55 (AS SUPPLIED BY INTERNATIONAL CONSTRUCTION SERVICES) CONFORMING TO ASTM A328. MINIMUM YIELD STRENGTH OF ALL STEEL SHEET PILES SHALL BE 39,000 PSI. SHEET PILES SHALL BE 18 FEET IN LENGTH.
2. PROTECTIVE COATING FOR STEEL SHEETS SHALL BE CARBOLINE 890 EPOXY COATING, APPLIED IN TWO SHOP COATS TO ACHIEVE FINAL MINIMUM DRY FILM THICKNESS OF 16 MILS IN ACCORDANCE WITH TECHNICAL SPECIFICATIONS, AS MANUFACTURED BY CARBOLINE CO., ST. LOUIS, MO. CARBOLINE 890 COLOR SHALL BE DARK BROWN COLOR NUMBER 2277 PER CARBOLINE COLOR SELECTION CHART. PROTECTIVE COATING SHALL BE APPLIED TO BOTH SIDES OF THE STEEL SHEET PILES FOR ONLY UPPER 9 FEET OF THEIR LENGTH.

TIMBER CAP NOTES:

1. ALL TIMBER SHALL BE DOUGLAS FIR, COAST REGION S4S NO.1, FOHC, NO LOOSE KNOTS.
2. ALL TIMBER SHALL BE PRESSURE TREATED WITH CHEMONITE (ACZA) PER AWPA STANDARD P5 TO A MINIMUM NET RETENTION OF 0.6 POUNDS PER CUBIC FOOT BY ASSAY PER AWPA STANDARD C2.
3. ALL TIMBER SHALL BE CUT TO LENGTH AND BOLT HOLES DRILLED PRIOR TO PRESSURE TREATMENT TO THE MAXIMUM EXTENT PRACTICABLE.

HARDWARE FASTENER NOTES:

1. ALL STEEL PRODUCTS FABRICATED FROM CHANNELS, ANGLES, PLATES AND BARS TO BE FABRICATED FROM MILD STEEL, CONFORMING TO ASTM A36 AND SHALL BE HOT DIP GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A123. ALL HOT DIP GALVANIZING TO BE A MINIMUM THREE (3) MILS THICK.
2. BOLTS, NUTS, WASHERS, AND OTHER HARDWARE SHALL BE MILD STEEL AND SHALL BE HOT DIP GALVANIZED IN ACCORDANCE WITH ASTM A153. ALL HOT DIP GALVANIZING TO BE A MINIMUM THREE (3) MILS THICK.
3. STAINLESS STEEL HARDWARE SHALL BE TYPE 316.

Steel Cantilever Bulkhead - Plan View

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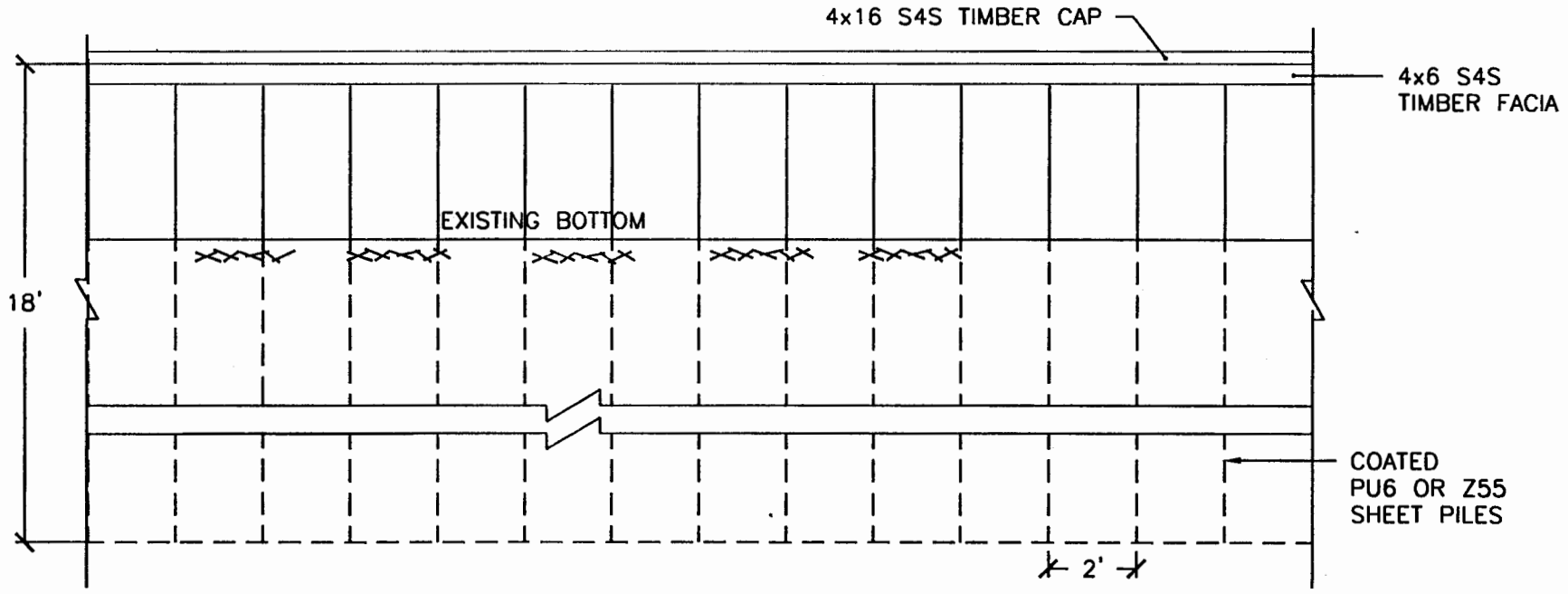
Figure 6



A/2 ELEVATION VIEW
SCALE: 1" = 4'

Steel Cantilever Bulkhead -Elevation View

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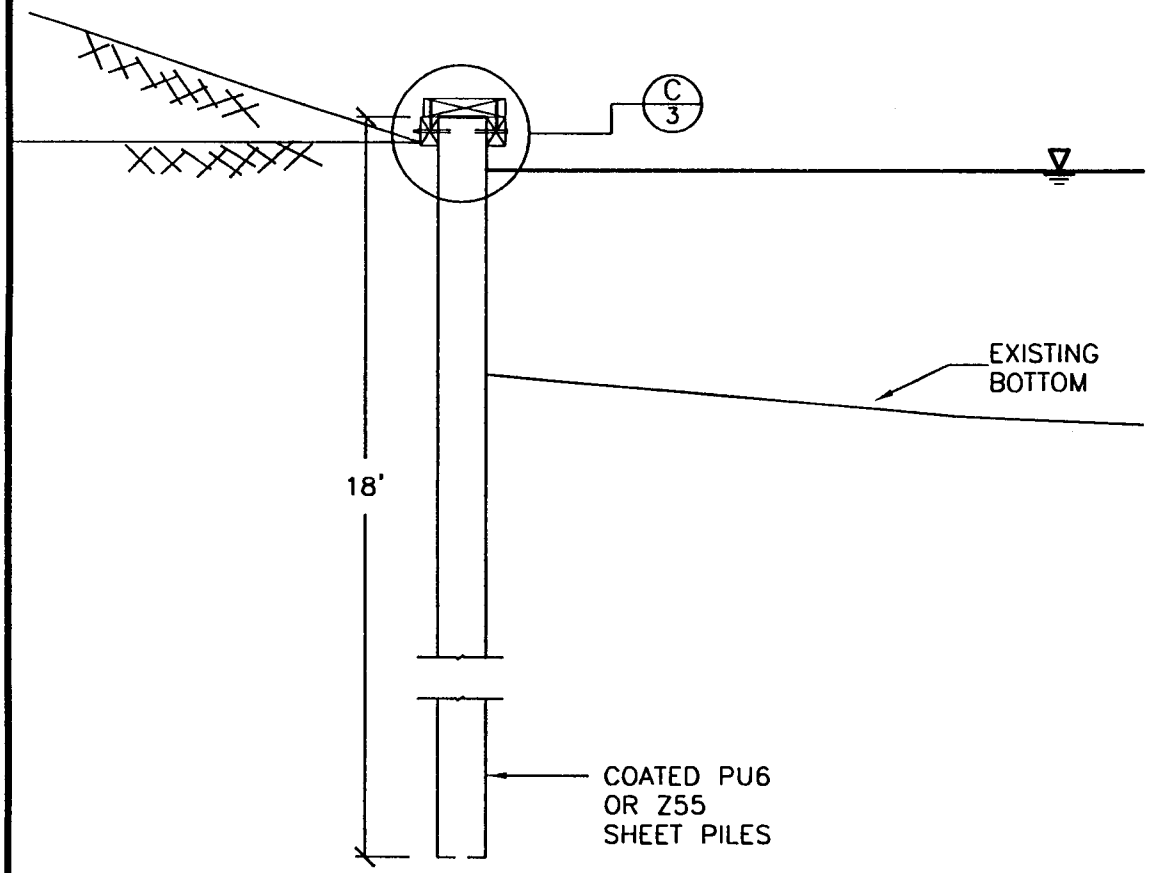
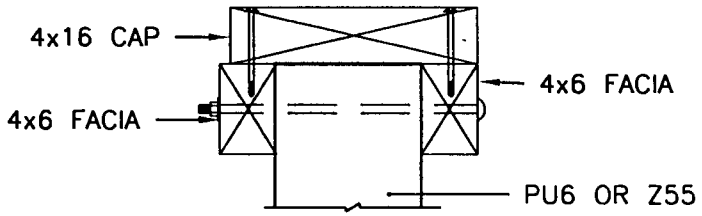
Figure 7



B/3 SECTION VIEW
SCALE: 1" = 3'



C/3 TIMBER CAP DETAIL
SCALE: 1" = 1'

Steel Cantilever Bulkhead - Section View

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Figure 8

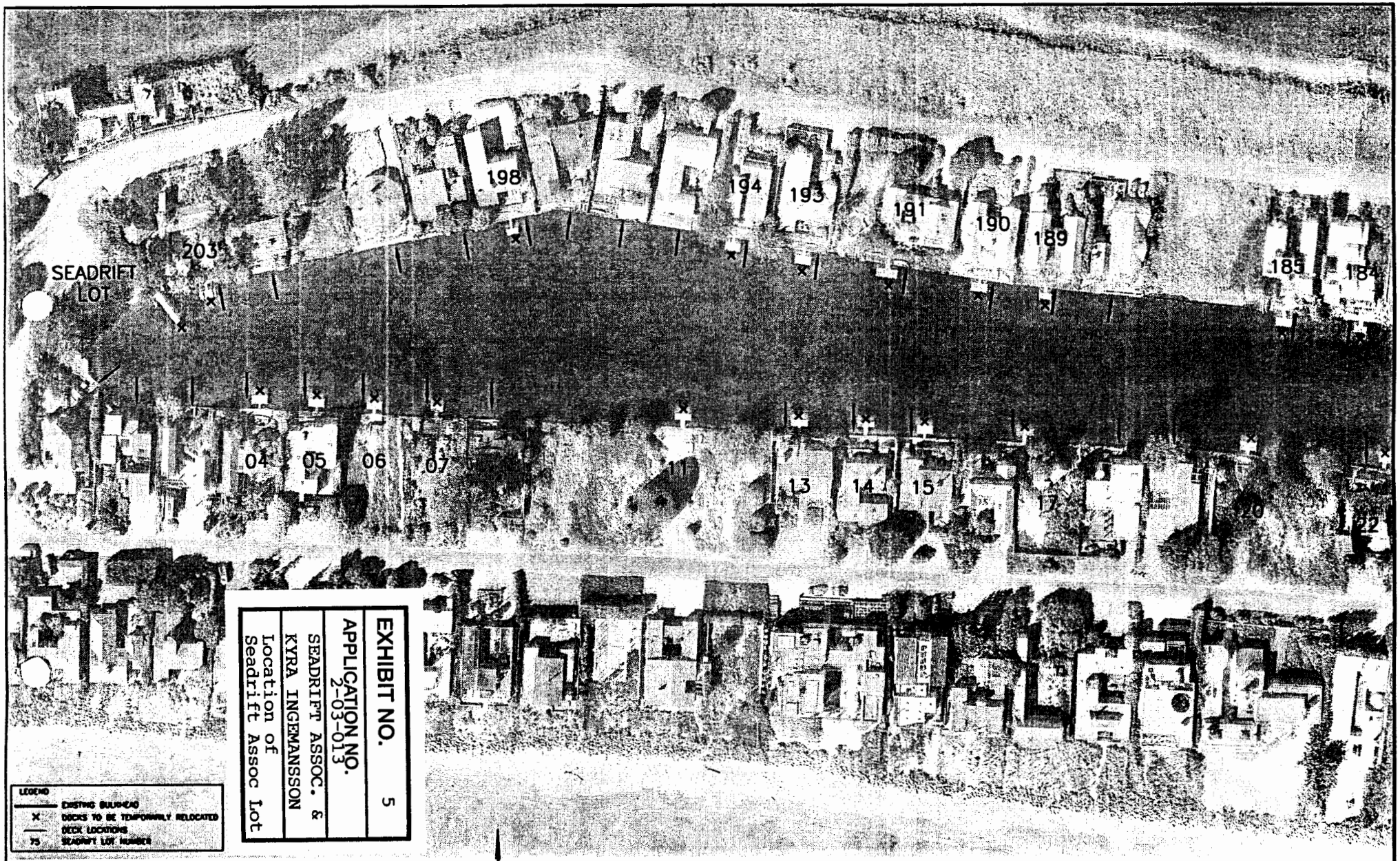


EXHIBIT NO. 5

APPLICATION NO. 2-03-013

SEADRIFT ASSOC. & KYRA INGEMANSSON

Location of Seadrift Assoc Lot

LEGEND

- EXISTING BULKHEAD
- × DOCKS TO BE TEMPORARILY RELOCATED
- DECK LOCATIONS
- 75 SEADRIFT LOT NUMBER

NOTES:

1. DIGITAL ORTHOPHOTO MAPPING PREPARED FROM AERIAL FLIGHTS AND LANDSIDE SURVEY CONTROL MARKERS PERFORMED DURING FEBRUARY 2002. LANDSIDE MAPPING OF 2-FEET ELEVATION CONTOURS BASED ON SURVEY CONTROL VERTICAL DATUM OF NGVD-29.
2. LAGOON WATER DEPTHS FROM HYDROGRAPHIC SURVEY PERFORMED ON FEBRUARY 20, 2002 AND ARE REFERENCED TO VERTICAL DATUM OF NGVD-29. LAGOON WATER SURFACE ELEVATION WAS +3.16 FEET NGVD AT TIME OF HYDROGRAPHIC SURVEY.
3. HORIZONTAL SURVEY CONTROL IS WGS83. COORDINATE SYSTEM IS CALIFORNIA STATE PLANE ZONE 3.

SCALE 40 0 40 80 120 160 FEET

NOBLE CONSULTANTS, INC.

SEADRIFT ASSOCIATION

INNER SEADRIFT LAGOON SITE PLAN 1

BULKHEAD IMPROVEMENT

SHEET 1 OF 5

JOB NO. 473-22

SCALE 1" = 40'

DATE JUNE 03

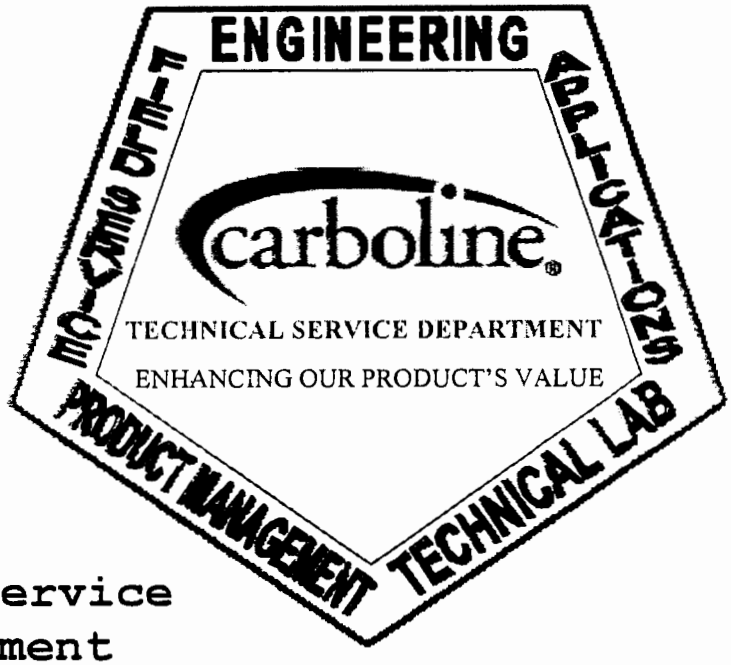
EXHIBIT NO. 6
APPLICATION NO. 2-03-013
SEADRIFT ASSOC. & KYRA INGEMANSSON
Carboline 890 Material Safety

Data Sheet
(Page 1 of 26)

350 Hanley Industrial Court
St. Louis, MO 63144
(314) 644-1000 Phone
(314) 644-4617 Fax

Carboline Customer Service Department

1-888-Carboline Phone
(314) 644-4684 Fax



Technical Service Department

(314) 644-1000 Phone
(314) 644-6883 Fax

SECTION I - PRODUCT: CARBOGUARD 890 PART A (0986A1NL)
Date: 10/21/02 Replaces 11/08/99
(aka CARBOLINE 890 PART A)
CHEMTREC TRANSPORTATION EMERGENCY PHONE NO.: 800-424-9300
PITTSBURGH POISON CONTROL CENTER HEALTH EMERGENCY NO.: 412-681-6669

SECTION II - HAZARDOUS INGREDIENTS EXPOSURE LIMITS

CHEMICAL NAME	(A)	(B)	(C)	(D)	(E)
COLOR PIGMENT	MIXTURE	30%	3.5MG/M3	NE	NE
EPOXY RESIN	25068-38-6	25%	NE	NE	NE
ALKYL PHTHALATE	68515-42-4	15%	NE	NE	NE
SILICA	14808-60-7	10%	0.1MG/M3	NE	NE
XYLENE	1330-20-7	10%	100 PPM	150 PPM	NE
AROMATIC SOLVENT	64742-95-6	5%	25PPM	NE	NE
ETHYL BENZENE	100-41-4	2%	100 PPM	125 PPM	NE

HAZARDOUS INGREDIENTS ADDITIONAL DATA

CHEMICAL NAME	(F)	(G)
COLOR PIGMENT	NOT AVAILABLE	NO/YES
EPOXY RESIN	11.4G/KG RAT,ORAL >20ML/KG SKIN,SENSITIZER	NO/NO/1,2
ALKYL PHTHALATE	NOT AVAILABLE	NO/NO
SILICA	NOT AVAILABLE	NO/NO/NR/NO
XYLENE	4300MG/KG RAT,ORAL 15000 PPM/4HRS RAT,INHALATION	NO/YES/1,2,3/ 1000#/U239
AROMATIC SOLVENT	4700MG/KG RAT,ORAL 3670PPM/8HRS RAT,INHALATION	NO/YES/1/2/3
ETHYL BENZENE	NOT AVAILABLE	NO/YES/1,2,3/ 1000#

TABLE (A) CAS NUMBER (B) LESS THAN WT (C) TLV-TWA (D) STEL (E) CEILING (F) TOXICITY DATA (LD50/Route,LC50/Route) (G) SARA 302/SARA 313/ SARA 311-312 CATEGORIES/CERCLA. NE = not established, NR = not required, NO = no. Color Pigment Mixture may contain Iron Oxides, Titanium Dioxide, Carbon Black, and other particulates not otherwise regulated in varying amounts depending on color of product.

WHMIS CLASSIFICATION: B2 -- D2A -- D2B
HMIS/NFPA CLASSIFICATION: HEALTH 2, FLAMMABILITY 3, REACTIVITY 0, PERSONAL PROTECTION CODE G, NFPA FIRE FIGHTING PHASE 4

SECTION III - PHYSICAL DATA:

BOILING RANGE: 277F(136C)-355F(179C). VAPOR DENSITY: Heavier than air. EVAPORATION RATE: Slower than ether. VOLATILE BY WEIGHT 10 %. VOLATILE BY VOLUME: 17 %. PRODUCT WT/GAL: 11.7 LBS/U.S.GAL. 1.40 sp gr.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA:

FLAMMABILITY CLASSIFICATION: FLASH POINT: 89 F(31C) (Setaflash) LEL 1.0 % UEL 7.0 %.

PRODUCT: CARBOGUARD 890 PART A (0986A1NL)
Date: 10/21/02 Replaces 11/08/99

OSHA-FLAMMABLE LIQUID/OSHA/CLASS/1C, DOT-PAINT,3,UN1263,PGIII, CANADIAN TDGA: PAINT,3,UN1263,PGIII
EXTINGUISHING MEDIA: Dry Chemical, Foam, Carbon Dioxide, Water Fog.
FIRE AND EXPLOSION HAZARDS: Vapors are heavier than air and will accumulate. Vapors will form explosive concentrations with air. Vapors travel long distances and will flashback. Use mechanical ventilation when necessary to keep percent vapor below the "Lower Explosion Level" (LEL). Eliminate all ignition sources. Keep away from sparks, open flames and heat sources. All electric equipment and installations should be made and grounded in accordance with the National Electrical Code. In areas where explosion hazards exist, workers should be required to use nonferrous tools and to wear conductive and non-sparking shoes.
SPECIAL FIRE FIGHTING PROCEDURES: Evacuate hazard area of unprotected personnel. Use a NIOSH approved self-contained breathing unit and complete body protection. Cool surrounding containers with water in case of fire exposure.

SECTION V - HEALTH HAZARD DATA:

INHALATION: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache or nausea. May cause nose and throat irritation.
CONTACT: May cause eye irritation. May cause skin irritation. May cause allergic skin reaction.
NOTICE: Contains SILICA which can cause cancer. Risk of cancer depends on duration and level of exposure. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.
MEDICAL CONDITIONS PRONE TO AGGRAVATION BY EXPOSURE: If sensitized to amines, epoxies or other chemicals do not use. See a physician if a medical condition exists.
PRIMARY ROUTE(S) OF ENTRY: Inhalation, Dermal, Ingestion.
EMERGENCY FIRST AID PROCEDURES: When exposed always get medical attention.
EYE CONTACT: Flush with water for 15 minutes.
SKIN CONTACT: Wash with soap and water. Remove contaminated clothing and clean before reuse.
INHALATION: Remove to fresh air. Provide oxygen if breathing is difficult. Use artificial respiration if not breathing. Get medical attention.
IF SWALLOWED: DO NOT INDUCE VOMITING!! Always get medical attention.

SECTION VI - REACTIVITY DATA:

STABILITY: This product is stable under normal storage conditions.
HAZARDOUS POLYMERIZATION: Will not occur under normal conditions.
HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.
CONDITIONS TO AVOID: Heat, sparks, and open flames.
INCOMPATIBILITY: Avoid contact with strong oxidizing agents.

PRODUCT: CARBOGUARD 890 PART A (0986A1NL)
Date: 10/21/02 Replaces 11/08/99

SECTION VII - SPILL OR LEAK PROCEDURES:

STEPS TO BE TAKEN IN CASE OF SPILL: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow safe handling and use guidelines in Section VIII. Contain and soak up residual with an absorbent (clay or sand). Take up absorbent material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section II for Sara Title III and CERCLA information.

SECTION VIII - SAFE HANDLING AND USE INFORMATION:

RESPIRATORY PROTECTION: Use only with ventilation to keep levels below exposure guidelines. (Section II). User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use.
VENTILATION: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).
SKIN AND EYE PROTECTION: Recommend impervious gloves, clothing and safety glasses with side shields or chemical goggles to avoid skin and eye contact. If material penetrates to skin, change gloves and clothing. Hypersensitive persons should wear gloves or use protective cream.
HYGIENIC PRACTICES: Wash with soap and water before eating, drinking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and pass through hazardous materials. Check shoes carefully after soaking before reuse.
APPLICATION: Use only in accordance with Carboline application instructions, container label and Product Data Sheet.

SECTION IX - SPECIAL PRECAUTIONS:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep away from heat, sparks, open flame, and strong oxidizing agents. Keep containers closed. Store in cool, dry place with adequate ventilation. If pouring or transferring materials, ground all containers and tools.
OTHER PRECAUTIONS: Do not weld, heat, cut or drill on full or empty containers.

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations.

PRODUCT: CARBOGUARD 890 PART A (0986A1NL)
Date: 10/21/02 Replaces 11/08/99

Carboline Company 350 Hanley Ind. Ct. St. Louis, MO 63144
PHONE NO. 314-644-1000 FOR INDUSTRIAL USE ONLY

CO. MATERIAL SAFETY DATA SHEET
OGUARD 890 PART A (0986A1NL)
te: 10/21/02 Replaces 11/08/99
ORY INFORMATION

s above 1 Percent:

AS	Pct
7924-34-9	20%

contains a chemical(s)
alifornia to cause
cts or other reproductive harm.

SECTION I - PRODUCT: CARBOGUARD 890 PART B (0986B1NL)
Date: 10/21/02 Replaces 11/08/99
(aka CARBOLINE 890 PART B)
CHEMTREC TRANSPORTATION EMERGENCY PHONE NO.: 800-424-9300
PITTSBURGH POISON CONTROL CENTER HEALTH EMERGENCY NO.: 412-681-6669

SECTION II - HAZARDOUS INGREDIENTS EXPOSURE LIMITS

CHEMICAL NAME	(A)	(B)	(C)	(D)	(E)
SILICA	14808-60-7	65%	0.1MG/M3	NE	NE
BENZYL ALCOHOL	100-51-6	10%	NE	NE	NE
XYLENE	1330-20-7	10%	100 PPM	150 PPM	NE
ISOPHORONE DIAMINE	2855-13-2	5%	NE	NE	NE
DIAMINOCYCLOHEXANE	694-83-7	5%	NE	NE	NE
CYCLOALIPHATIC AMINE	TRADE SECRET	5%	NE	NE	NE
CYCLOALIPHATIC AMINE	BLEND	5%	NE	NE	NE
TOLUENE	108-88-3	5%	50 PPM	150 PPM	NE
AROMATIC SOLVENT	64742-95-6	5%	25PPM	NE	NE
ISOPROPANOL	67-63-0	5%	400 PPM	500 PPM	NE
ETHYL BENZENE	100-41-4	2%	100 PPM	125 PPM	NE

HAZARDOUS INGREDIENTS ADDITIONAL DATA

CHEMICAL NAME	(F)	(G)
SILICA	NOT AVAILABLE	NO/NO/NR/NO
BENZYL ALCOHOL	1230MG/KG RAT,ORAL 1000PPM/8HRS RAT,INHALATION	NO/NO
XYLENE	4300MG/KG RAT,ORAL 15000 PPM/4HRS RAT,INHALATION	NO/YES/1,2,3/ 1000#/U239
ISOPHORONE DIAMINE	>0.5 G/KG ORAL >2 G/KG DERMAL	NO\NO
DIAMINOCYCLOHEXANE	1752 MG/KG,RAT,ORAL NE	NO/NO
CYCLOALIPHATIC AMINE	1230 MG/KG ORAL RAT;2000 MG/KG DERMAL	NO/NO/1,2
CYCLOALIPHATIC AMINE	NOT AVAILABLE	NO/NO/1,2
TOLUENE	5.0 G/KG RAT ORAL, 14G/KG RABBIT DERMAL 8000 PPM/4HRS, RAT, INHALATION	NO/YES/1,2,3/ 1000#/U220
AROMATIC SOLVENT	4700MG/KG RAT,ORAL 3670PPM/8HRS RAT,INHALATION	NO/YES/1/2/3
ISOPROPANOL	4720MG/KG RAT,ORAL 16000PPM/8HRS RAT,INHALATION	NO/NO/1,2,3
ETHYL BENZENE	NOT AVAILABLE	NO/YES/1,2,3/ 1000#

TABLE (A) CAS NUMBER (B) LESS THAN WT (C) TLV-TWA (D) STEL (E) CEILING (F) TOXICITY DATA (LD50/Route,LC50/Route) (G) SARA 302/SARA 313/ SARA 311-312 CATEGORIES/CERCLA. NE = not established, NR = not required, NO = no. Color Pigment Mixture may contain Iron Oxides, Titanium Dioxide, Carbon Black, and other particulates not otherwise regulated in varying amounts depending on color of product.

WHMIS CLASSIFICATION: B2 -- D2A -- D2B -- E

PRODUCT: CARBOGUARD 890 PART B (0986B1NL)
Date: 10/21/02 Replaces 11/08/99

HMIS/NFPA CLASSIFICATION: HEALTH 3, FLAMMABILITY 3, REACTIVITY 0, PERSONAL PROTECTION CODE G, NFPA FIRE FIGHTING PHASE 4

SECTION III - PHYSICAL DATA:

BOILING RANGE: 180F(82C)-355F(179C). VAPOR DENSITY: Heavier than air. EVAPORATION RATE: Slower than ether. VOLATILE BY WEIGHT 17 %. VOLATILE BY VOLUME: 32 %. PRODUCT WT/GAL: 13.3 LBS/U.S.GAL. 1.60 sp gr.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA:

FLAMMABILITY CLASSIFICATION: FLASH POINT: 71 F(21C) (Setaflash) LEL 1.0 % UEL 12.0 %.
OSHA-FLAMMABLE LIQUID/OSHA/CLASS/1B, DOT-PAINT,3,UN1263,PGII, CANADIAN TDGA: PAINT,3,UN1263,PGII
EXTINGUISHING MEDIA: Dry Chemical, Foam, Carbon Dioxide, Water Fog.
FIRE AND EXPLOSION HAZARDS: Vapors are heavier than air and will accumulate. Vapors will form explosive concentrations with air. Vapors travel long distances and will flashback. Use mechanical ventilation when necessary to keep percent vapor below the "Lower Explosion Level" (LEL). Eliminate all ignition sources. Keep away from sparks, open flames and heat sources. All electric equipment and installations should be made and grounded in accordance with the National Electrical Code. In areas where explosion hazards exist, workers should be required to use nonferrous tools and to wear conductive and non-sparking shoes.
SPECIAL FIRE FIGHTING PROCEDURES: Evacuate hazard area of unprotected personnel. Use a NIOSH approved self-contained breathing unit and complete body protection. Cool surrounding containers with water in case of fire exposure.

SECTION V - HEALTH HAZARD DATA:

INHALATION: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache or nausea. May cause nose and throat irritation. May cause lung irritation. May cause allergic respiratory reaction, effects may be permanent.
CONTACT: Can cause eye burns. May be harmful if absorbed through the skin. Can cause skin burns. Can cause allergic skin reaction.
NOTICE: Contains SILICA which can cause cancer. Risk of cancer depends on duration and level of exposure. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.
MEDICAL CONDITIONS PRONE TO AGGRAVATION BY EXPOSURE: If you have a condition that could be aggravated by exposure to dust or organic vapors see a physician prior to use.
PRIMARY ROUTE(S) OF ENTRY: Inhalation, Dermal, Ingestion.
EMERGENCY FIRST AID PROCEDURES: When exposed always get medical attention.
EYE CONTACT: Flush with water for 15 minutes.
SKIN CONTACT: Wash with soap and water. Remove contaminated clothing and

clean before reuse.
INHALATION: Remove to fresh air. Provide oxygen if breathing is difficult. Use artificial respiration if not breathing. Get medical attention.
IF SWALLOWED: DO NOT INDUCE VOMITING!! Always get medical attention.

SECTION VI - REACTIVITY DATA:

STABILITY: This product is stable under normal storage conditions.
HAZARDOUS POLYMERIZATION: Will not occur under normal conditions.
HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.
CONDITIONS TO AVOID: Heat, sparks, and open flames.
INCOMPATIBILITY: Avoid contact with strong oxidizing agents.

SECTION VII - SPILL OR LEAK PROCEDURES:

STEPS TO BE TAKEN IN CASE OF SPILL: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow safe handling and use guidelines in Section VIII. Contain and soak up residual with an absorbent (clay or sand). Take up absorbent material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section II for Sara Title III and CERCLA information.

SECTION VIII - SAFE HANDLING AND USE INFORMATION:

RESPIRATORY PROTECTION: Use only with ventilation to keep levels below exposure guidelines. (Section II). User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use.
VENTILATION: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).
SKIN AND EYE PROTECTION: Recommend impervious gloves, clothing and safety glasses with side shields or chemical goggles to avoid skin and eye contact. If material penetrates to skin, change gloves and clothing. Hypersensitive persons should wear gloves or use protective cream.
HYGIENIC PRACTICES: Wash with soap and water before eating, drinking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and pass through hazardous materials. Check shoes carefully after soaking before reuse.
APPLICATION: Use only in accordance with Carboline application instructions, container label and Product Data Sheet.

PRODUCT: CARBOGUARD 890 PART B (0986B1NL)
Date: 10/21/02 Replaces 11/08/99

SECTION IX - SPECIAL PRECAUTIONS:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep away from heat, sparks, open flame, and strong oxidizing agents. Keep containers closed. Store in cool, dry place with adequate ventilation. If pouring or transferring materials, ground all containers and tools.
OTHER PRECAUTIONS: Do not weld, heat, cut or drill on full or empty containers.

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations.

Carboline Company 350 Hanley Ind. Ct. St. Louis, MO 63144
PHONE NO. 314-644-1000 FOR INDUSTRIAL USE ONLY

SPECIFIC STATE REGULATORY INFORMATION

NEW JERSEY
PENNSYLVANIA
Non-Hazardous Materials above 1 Percent:

Name	CAS	Pct
POLYMER SOLUTION	MIXTURE	5%

CALIFORNIA

WARNING: This product contains a chemical(s) known to the State of California to cause cancer, and birth defects or other reproductive harm.

SECTION I - PRODUCT: CARBOGUARD 890 LT PART B (0983B1NL)
Date: 12/02/02 Replaces 11/17/99
(aka CARBOLINE 890 LT PART B)
CHEMTREC TRANSPORTATION EMERGENCY PHONE NO.: 800-424-9300
PITTSBURGH POISON CONTROL CENTER HEALTH EMERGENCY NO.: 412-681-6669

SECTION II - HAZARDOUS INGREDIENTS EXPOSURE LIMITS

CHEMICAL NAME	(A)	(B)	(C)	(D)	(E)
SILICA	14808-60-7	60%	0.1MG/M3	NE	NE
BENZYL ALCOHOL	100-51-6	10%	NE	NE	NE
XYLENE	1330-20-7	10%	100 PPM	150 PPM	NE
TDMAM PHENOL	90-72-2	5%	NE	NE	NE
NONYL PHENOL	25154-52-3	5%	NE	NE	NE
AROMATIC SOLVENT	64742-95-6	5%	25PPM	NE	NE
ISOPROPANOL	67-63-0	5%	400 PPM	500 PPM	NE
ETHYL BENZENE	100-41-4	2%	100 PPM	125 PPM	NE

CHEMICAL NAME	HAZARDOUS INGREDIENTS (F)	ADDITIONAL DATA (G)
SILICA	NOT AVAILABLE	NO/NO/NR/NO
BENZYL ALCOHOL	1230MG/KG RAT,ORAL 1000PPM/8HRS RAT,INHALATION	NO/NO
XYLENE	4300MG/KG RAT,ORAL 15000 PPM/4HRS RAT,INHALATION	NO/YES/1,2,3/ 1000#/U239
TDMAM PHENOL	2169 MG/KG ORAL	NO/NO
NONYL PHENOL	1620MG/KG ORAL 2140 MG/KG SKIN	NO/NO
AROMATIC SOLVENT	4700MG/KG RAT,ORAL 3670PPM/8HRS RAT,INHALATION	NO/YES/1/2/3
ISOPROPANOL	4720MG/KG RAT,ORAL 16000PPM/8HRS RAT,INHALATION	NO/NO/1,2,3
ETHYL BENZENE	NOT AVAILABLE	NO/YES/1,2,3/ 1000#

TABLE (A) CAS NUMBER (B) LESS THAN WT (C) TLV-TWA (D) STEL (E) CEILING (F) TOXICITY DATA (LD50/Route,LC50/Route) (G) SARA 302/SARA 313/ SARA 311-312 CATEGORIES/CERCLA. NE = not established, NR = not required, NO = no. Color Pigment Mixture may contain Iron Oxides, Titanium Dioxide, Carbon Black, and other particulates not otherwise regulated in varying amounts depending on color of product.

WHMIS CLASSIFICATION: B2 -- D2A -- D2B
HMIS/NFPA CLASSIFICATION: HEALTH 3, FLAMMABILITY 3, REACTIVITY 0, PERSONAL PROTECTION CODE G, NFPA FIRE FIGHTING PHASE 4

SECTION III - PHYSICAL DATA:

BOILING RANGE: 180F(82C)-355F(179C). VAPOR DENSITY: Heavier than air. EVAPORATION RATE: Slower than ether. VOLATILE BY WEIGHT 14 %. VOLATILE BY VOLUME: 25 %. PRODUCT WT/GAL: 12.7 LBS/U.S.GAL. 1.53 sp gr.

PRODUCT: CARBOGUARD 890 LT PART B (0983B1NL)
Date: 12/02/02 Replaces 11/17/99

SECTION IV - FIRE AND EXPLOSION HAZARD DATA:

FLAMMABILITY CLASSIFICATION: FLASH POINT: 71 F(21C) (Setaflash) LEL 1.0 % UEL 12.0 %.
OSHA-FLAMMABLE LIQUID/OSHA/CLASS/1B, DOT-PAINT,3,UN1263,PGII, CANADIAN TDGA: PAINT,3,UN1263,PGII
EXTINGUISHING MEDIA: Dry Chemical, Foam, Carbon Dioxide, Water Fog.
FIRE AND EXPLOSION HAZARDS: Product contains less than 1% volatile components. The amount of vapors that could accumulate are minimal. However vapors are heavier than air and could travel long distances ignite and flashback. Eliminate all ignition sources. Keep away from sparks, open flames, and heat sources. All electrical equipment and installations should be made and grounded in accordance with the National Electrical Code. In areas where explosion hazards exist, workers should be required to use nonferrous tools and to wear conductive and non-sparking shoes.
SPECIAL FIRE FIGHTING PROCEDURES: Evacuate hazard area of unprotected personnel. Use a NIOSH approved self-contained breathing unit and complete body protection. Cool surrounding containers with water in case of fire exposure.

SECTION V - HEALTH HAZARD DATA:

INHALATION: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache or nausea. May cause nose and throat irritation. May cause lung irritation. May cause allergic respiratory reaction, effects may be permanent.
CONTACT: May cause eye burns. May be harmful if absorbed through the skin. May cause skin irritation.
NOTICE: Contains SILICA which can cause cancer. Risk of cancer depends on duration and level of exposure. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.
MEDICAL CONDITIONS PRONE TO AGGRAVATION BY EXPOSURE: If you have a condition that could be aggravated by exposure to dust or organic vapors see a physician prior to use.
PRIMARY ROUTE(S) OF ENTRY: Inhalation, Dermal, Ingestion.
EMERGENCY FIRST AID PROCEDURES: When exposed always get medical attention.
EYE CONTACT: Flush with water for 15 minutes.
SKIN CONTACT: Wash with soap and water. Remove contaminated clothing and clean before reuse.
INHALATION: Remove to fresh air. Provide oxygen if breathing is difficult. Use artificial respiration if not breathing. Get medical attention.
IF SWALLOWED: DO NOT INDUCE VOMITING!! Always get medical attention.

SECTION VI - REACTIVITY DATA:

STABILITY: This product is stable under normal storage conditions.
HAZARDOUS POLYMERIZATION: Will not occur under normal conditions.

HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.
CONDITIONS TO AVOID: Heat, sparks, and open flames.
INCOMPATIBILITY: Avoid contact with strong oxidizing agents.

SECTION VII - SPILL OR LEAK PROCEDURES:

STEPS TO BE TAKEN IN CASE OF SPILL: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow safe handling and use guidelines in Section VIII. Contain and soak up residual with an absorbent (clay or sand). Take up absorbent material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section II for Sara Title III and CERCLA information.

SECTION VIII - SAFE HANDLING AND USE INFORMATION:

RESPIRATORY PROTECTION: Use only with ventilation to keep levels below exposure guidelines. (Section II). User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use.
VENTILATION: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).
SKIN AND EYE PROTECTION: Recommend impervious gloves, clothing and safety glasses with side shields or chemical goggles to avoid skin and eye contact. If material penetrates to skin, change gloves and clothing. Hypersensitive persons should wear gloves or use protective cream.
HYGIENIC PRACTICES: Wash with soap and water before eating, drinking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and pass through hazardous materials. Check shoes carefully after soaking before reuse.
APPLICATION: Use only in accordance with Carboline application instructions, container label and Product Data Sheet.

SECTION IX - SPECIAL PRECAUTIONS:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep away from heat, sparks, open flame, and strong oxidizing agents. Keep containers closed. Store in cool, dry place with adequate ventilation. If pouring or transferring materials, ground all containers and tools.
OTHER PRECAUTIONS: Do not weld, heat, cut or drill on full or empty containers.

PRODUCT: CARBOGUARD 890 LT PART B (0983B1NL)
Date: 12/02/02 Replaces 11/17/99

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations.

Carboline Company 350 Hanley Ind. Ct. St. Louis, MO 63144
PHONE NO. 314-644-1000 FOR INDUSTRIAL USE ONLY

CARBOLINE CO. MATERIAL SAFETY DATA SHEET
PRODUCT: CARBOGUARD 890 LT PART B (0983B1NL)
Date: 12/02/02 Replaces 11/17/99

SPECIFIC STATE REGULATORY INFORMATION

NEW JERSEY
PENNSYLVANIA
Non-Hazardous Materials above 1 Percent:

Name	CAS	Pct
POLYAMIDE	MIXTURE	15%
POLYMER SOLUTION	MIXTURE	5%

CALIFORNIA

WARNING: This product contains a chemical(s) known to the State of California to cause cancer, and birth defects or other reproductive harm.

SECTION I - PRODUCT: CARBOGUARD 890 PT A MXD OXIDE (0986A1YL)
Date: 02/12/03 Replaces 11/10/99
(aka CARBOLINE 890 PT A MXD OXIDE)
CHEMTREC TRANSPORTATION EMERGENCY PHONE NO.: 800-424-9300
PITTSBURGH POISON CONTROL CENTER HEALTH EMERGENCY NO.: 412-681-6669

SECTION II - HAZARDOUS INGREDIENTS EXPOSURE LIMITS

CHEMICAL NAME	(A)	(B)	(C)	(D)	(E)
MIXED METAL OXIDES	MIXTURE	40%	0.5MG.M3	NE	NE
EPOXY RESIN	25068-38-6	25%	NE	NE	NE
ALKYL PHTHALATE	68515-42-4	15%	NE	NE	NE
XYLENE	1330-20-7	10%	100 PPM	150 PPM	NE
AROMATIC SOLVENT	64742-95-6	5%	25PPM	NE	NE
ETHYL BENZENE	100-41-4	2%	100 PPM	125 PPM	NE
SILICA	14808-60-7	2%	0.1MG/M3	NE	NE

HAZARDOUS INGREDIENTS ADDITIONAL DATA

CHEMICAL NAME	(F)	(G)
MIXED METAL OXIDES	>10,000MG/KG ORAL NE	NO/YES
EPOXY RESIN	11.4G/KG RAT,ORAL >20ML/KG SKIN,SENSITIZER	NO/NO/1,2
ALKYL PHTHALATE	NOT AVAILABLE	NO/NO
XYLENE	4300MG/KG RAT,ORAL 15000 PPM/4HRS RAT,INHALATION	NO/YES/1,2,3/ 1000#/U239
AROMATIC SOLVENT	4700MG/KG RAT,ORAL 3670PPM/8HRS RAT,INHALATION	NO/YES/1/2/3
ETHYL BENZENE	NOT AVAILABLE	NO/YES/1,2,3/ 1000#
SILICA	NOT AVAILABLE	NO/NO/NR/NO

TABLE (A) CAS NUMBER (B) LESS THAN WT (C) TLV-TWA (D) STEL (E) CEILING (F) TOXICITY DATA (LD50/Route,LC50/Route) (G) SARA 302/SARA 313/ SARA 311-312 CATEGORIES/CERCLA. NE = not established, NR = not required, NO = no. Color Pigment Mixture may contain Iron Oxides, Titanium Dioxide, Carbon Black, and other particulates not otherwise regulated in varying amounts depending on color of product.

WHMIS CLASSIFICATION: B2 -- D2A -- D2B
HMIS/NFPA CLASSIFICATION: HEALTH 2, FLAMMABILITY 3, REACTIVITY 0, PERSONAL PROTECTION CODE G, NFPA FIRE FIGHTING PHASE 4

SECTION III - PHYSICAL DATA:

BOILING RANGE: 277F(136C)-355F(179C). VAPOR DENSITY: Heavier than air. EVAPORATION RATE: Slower than ether. VOLATILE BY WEIGHT 9 %. VOLATILE BY VOLUME: 17 %. PRODUCT WT/GAL: 12.7 LBS/U.S.GAL. 1.53 sp gr.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA:

FLAMMABILITY CLASSIFICATION: FLASH POINT: 89 F(31C) (Setaflash) LEL 1.0 %

UEL 7.0 %.
OSHA-FLAMMABLE LIQUID/OSHA/CLASS/1C, DOT-PAINT,3,UN1263,PGIII, CANADIAN TDGA: PAINT,3,UN1263,PGIII
EXTINGUISHING MEDIA: Dry Chemical, Foam, Carbon Dioxide, Water Fog.
FIRE AND EXPLOSION HAZARDS: Vapors are heavier than air and will accumulate. Vapors will form explosive concentrations with air. Vapors travel long distances and will flashback. Use mechanical ventilation when necessary to keep percent vapor below the "Lower Explosion Level" (LEL). Eliminate all ignition sources. Keep away from sparks, open flames and heat sources. All electric equipment and installations should be made and grounded in accordance with the National Electrical Code. In areas where explosion hazards exist, workers should be required to use nonferrous tools and to wear conductive and non-sparking shoes.
SPECIAL FIRE FIGHTING PROCEDURES: Evacuate hazard area of unprotected personnel. Use a NIOSH approved self-contained breathing unit and complete body protection. Cool surrounding containers with water in case of fire exposure.

SECTION V - HEALTH HAZARD DATA:

INHALATION: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache or nausea. May cause nose and throat irritation.
CONTACT: May cause eye irritation. May cause skin irritation. May cause allergic skin reaction.
NOTICE: Contains SILICA which can cause cancer. Risk of cancer depends on duration and level of exposure. Contains MIXED METAL OXIDE PIGMENTS which are the result of high temperature calcination of the component substances. Due to the resultant unique crystalline structure the properties of this finished pigment do not necessarily reflect the properties of the component metals or oxides. Some compounds of the metals used in the manufacturing of this pigment have demonstrated various toxic properties. However, there is no evidence that this pigment has these toxic characteristics. IARC considers nickel compounds to be carcinogenic to humans (Monograph #49). IARC has classified cobalt and cobalt compounds as possibly carcinogenic to humans (Class 2B Monograph #52) Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.
MEDICAL CONDITIONS PRONE TO AGGRAVATION BY EXPOSURE: If sensitized to amines, epoxies or other chemicals do not use. See a physician if a medical condition exists.
PRIMARY ROUTE(S) OF ENTRY: Inhalation, Dermal, Ingestion.
EMERGENCY FIRST AID PROCEDURES: When exposed always get medical attention.
EYE CONTACT: Flush with water for 15 minutes.
SKIN CONTACT: Wash with soap and water. Remove contaminated clothing and clean before reuse.
INHALATION: Remove to fresh air. Provide oxygen if breathing is difficult. Use artificial respiration if not breathing. Get medical attention.
IF SWALLOWED: DO NOT INDUCE VOMITING!! Always get medical attention.

PRODUCT: CARBOGUARD 890 PT A MXD OXIDE (0986A1YL)
Date: 02/12/03 Replaces 11/10/99

SECTION VI - REACTIVITY DATA:

STABILITY: This product is stable under normal storage conditions.
HAZARDOUS POLYMERIZATION: Will not occur under normal conditions.
HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.
CONDITIONS TO AVOID: Heat, sparks, and open flames.
INCOMPATIBILITY: Avoid contact with strong oxidizing agents.

SECTION VII - SPILL OR LEAK PROCEDURES:

STEPS TO BE TAKEN IN CASE OF SPILL: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow safe handling and use guidelines in Section VIII. Contain and soak up residual with an absorbent (clay or sand). Take up absorbent material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section II for Sara Title III and CERCLA information.

SECTION VIII - SAFE HANDLING AND USE INFORMATION:

RESPIRATORY PROTECTION: Use only with ventilation to keep levels below exposure guidelines. (Section II). User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use.
VENTILATION: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).
SKIN AND EYE PROTECTION: Recommend impervious gloves, clothing and safety glasses with side shields or chemical goggles to avoid skin and eye contact. If material penetrates to skin, change gloves and clothing. Hypersensitive persons should wear gloves or use protective cream.
HYGIENIC PRACTICES: Wash with soap and water before eating, drinking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and pass through hazardous materials. Check shoes carefully after soaking before reuse.
APPLICATION: Use only in accordance with Carboline application instructions, container label and Product Data Sheet.

SECTION IX - SPECIAL PRECAUTIONS:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep away from heat, sparks, open flame, and strong oxidizing agents. Keep containers closed. Store in cool, dry place with adequate ventilation. If pouring or

transferring materials, ground all containers and tools.
OTHER PRECAUTIONS: Do not weld, heat, cut or drill on full or empty containers.

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations.

Carboline Company 350 Hanley Ind. Ct. St. Louis, MO 63144
PHONE NO. 314-644-1000 FOR INDUSTRIAL USE ONLY

CARBOLINE CO. MATERIAL SAFETY DATA SHEET
PRODUCT: CARBOGUARD 890 PT A MXD OXIDE (0986A1YL)
Date: 02/12/03 Replaces 11/10/99

SPECIFIC STATE REGULATORY INFORMATION

NEW JERSEY
PENNSYLVANIA
Non-Hazardous Materials above 1 Percent:

Name	CAS	Pct
EPOXY RESIN	67924-34-9	20%

CALIFORNIA

WARNING: This product contains a chemical(s) known to the State of California to cause cancer, and birth defects or other reproductive harm.

SECTION I - PRODUCT: CARBOGUARD 890 ALUMINUM PT A (0986A1AL)
Date: 02/12/03 Replaces 11/10/99
(aka CARBOLINE 890 ALUMINUM PART A)
CHEMTREC TRANSPORTATION EMERGENCY PHONE NO.: 800-424-9300
PITTSBURGH POISON CONTROL CENTER HEALTH EMERGENCY NO.: 412-681-6669

SECTION II - HAZARDOUS INGREDIENTS EXPOSURE LIMITS

CHEMICAL NAME	(A)	(B)	(C)	(D)	(E)
SILICA	14808-60-7	30%	0.1MG/M3	NE	NE
ALKYL PHTHALATE	68515-42-4	15%	NE	NE	NE
EPOXY RESIN	25068-38-6	15%	NE	NE	NE
XYLENE	1330-20-7	10%	100 PPM	150 PPM	NE
ALUMINUM	7429-90-5	10%	15MG/M3	NE	NE
AROMATIC SOLVENT	64742-95-6	5%	25PPM	NE	NE
ETHYL BENZENE	100-41-4	2%	100 PPM	125 PPM	NE

CHEMICAL NAME	HAZARDOUS INGREDIENTS ADDITIONAL DATA (F)	(G)
SILICA	NOT AVAILABLE	NO/NO/NR/NO
ALKYL PHTHALATE	NOT AVAILABLE	NO/NO
EPOXY RESIN	11.4G/KG RAT,ORAL >20ML/KG SKIN,SENSITIZER	NO/NO/1,2
XYLENE	4300MG/KG RAT,ORAL 15000 PPM/4HRS RAT,INHALATION	NO/YES/1,2,3/ 1000#/U239
ALUMINUM	NOT AVAILABLE	NO/YES
AROMATIC SOLVENT	4700MG/KG RAT,ORAL 3670PPM/8HRS RAT,INHALATION	NO/YES/1/2/3
ETHYL BENZENE	NOT AVAILABLE	NO/YES/1,2,3/ 1000#

TABLE (A) CAS NUMBER (B) LESS THAN WT (C) TLV-TWA (D) STEL (E) CEILING (F) TOXICITY DATA (LD50/Route,LC50/Route) (G) SARA 302/SARA 313/ SARA 311-312 CATEGORIES/CERCLA. NE = not established, NR = not required, NO = no. Color Pigment Mixture may contain Iron Oxides, Titanium Dioxide, Carbon Black, and other particulates not otherwise regulated in varying amounts depending on color of product.

WHMIS CLASSIFICATION: B2 -- D2A -- D2B
HMIS/NFPA CLASSIFICATION: HEALTH 2, FLAMMABILITY 3, REACTIVITY 1, PERSONAL PROTECTION CODE G, NFPA FIRE FIGHTING PHASE 4

SECTION III - PHYSICAL DATA:

BOILING RANGE: 277F(136C)-355F(179C). VAPOR DENSITY: Heavier than air. EVAPORATION RATE: Slower than ether. VOLATILE BY WEIGHT 10 %. VOLATILE BY VOLUME: 16 %. PRODUCT WT/GAL: 11.1 LBS/U.S.GAL. 1.34 sp gr.

SECTION IV - FIRE AND EXPLOSION HAZARD DATA:

FLAMMABILITY CLASSIFICATION: FLASH POINT: 89 F(31C) (Setaflash) LEL 1.0 % UEL 7.0 %.

PRODUCT: CARBOGUARD 890 ALUMINUM PT A (0986A1AL)
Date: 02/12/03 Replaces 11/10/99

OSHA-FLAMMABLE LIQUID/OSHA/CLASS/1C, DOT-PAINT,3,UN1263,PGIII, CANADIAN TDGA: PAINT,3,UN1263,PGIII
EXTINGUISHING MEDIA: Dry Chemical, Foam, Carbon Dioxide, Water Fog.
FIRE AND EXPLOSION HAZARDS: Vapors are heavier than air and will accumulate. Vapors will form explosive concentrations with air. Vapors travel long distances and will flashback. Use mechanical ventilation when necessary to keep percent vapor below the "Lower Explosion Level" (LEL). Eliminate all ignition sources. Keep away from sparks, open flames and heat sources. All electric equipment and installations should be made and grounded in accordance with the National Electrical Code. In areas where explosion hazards exist, workers should be required to use nonferrous tools and to wear conductive and non-sparking shoes.
SPECIAL FIRE FIGHTING PROCEDURES: Evacuate hazard area of unprotected personnel. Use a NIOSH approved self-contained breathing unit and complete body protection. Cool surrounding containers with water in case of fire exposure.

SECTION V - HEALTH HAZARD DATA:

INHALATION: Harmful if inhaled, may affect the brain or nervous system, causing dizziness, headache or nausea. May cause nose and throat irritation.
CONTACT: May cause eye irritation. May cause skin irritation. May cause allergic skin reaction.
NOTICE: Contains SILICA which can cause cancer. Risk of cancer depends on duration and level of exposure. Reports have associated repeated and prolonged occupational overexposure to solvents with permanent brain and nervous system damage.
MEDICAL CONDITIONS PRONE TO AGGRAVATION BY EXPOSURE: If sensitized to amines, epoxies or other chemicals do not use. See a physician if a medical condition exists.
PRIMARY ROUTE(S) OF ENTRY: Inhalation, Dermal, Ingestion.
EMERGENCY FIRST AID PROCEDURES: When exposed always get medical attention.
EYE CONTACT: Flush with water for 15 minutes.
SKIN CONTACT: Wash with soap and water. Remove contaminated clothing and clean before reuse.
INHALATION: Remove to fresh air. Provide oxygen if breathing is difficult. Use artificial respiration if not breathing. Get medical attention.
IF SWALLOWED: DO NOT INDUCE VOMITING!! Always get medical attention.

SECTION VI - REACTIVITY DATA:

STABILITY: This product is stable under normal storage conditions.
HAZARDOUS POLYMERIZATION: Will not occur under normal conditions.
HAZARDOUS DECOMPOSITION PRODUCTS: Carbon monoxide, nitrogen oxides, and unidentified organic compounds. Consider all smoke and fumes from burning material as very hazardous. Welding, cutting or abrasive grinding can create smoke and fumes. Do not breathe any fumes or smoke from these operations.
CONDITIONS TO AVOID: Heat, sparks, and open flames.
INCOMPATIBILITY: Avoid contact with strong oxidizing agents.

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SECTION VII - SPILL OR LEAK PROCEDURES:

STEPS TO BE TAKEN IN CASE OF SPILL: Eliminate all ignition sources. Handling equipment must be grounded to prevent sparking. Evacuate the area of unprotected personnel. Wear appropriate personal protection clothing and equipment. Follow safe handling and use guidelines in Section VIII. Contain and soak up residual with an absorbent (clay or sand). Take up absorbent material and seal tightly for proper disposal. Dispose of in accordance with local, state and federal regulations. Refer to Section II for Sara Title III and CERCLA information.

SECTION VIII - SAFE HANDLING AND USE INFORMATION:

RESPIRATORY PROTECTION: Use only with ventilation to keep levels below exposure guidelines. (Section II). User should test and monitor exposure levels to ensure all personnel are below guidelines. If not sure, or not able to monitor, use MSHA/NIOSH approved supplied air respirator. Follow all current OSHA requirements for respirator use.
VENTILATION: Use explosion-proof ventilation when required to keep below health exposure guidelines and Lower Explosion Limit (LEL).
SKIN AND EYE PROTECTION: Recommend impervious gloves, clothing and safety glasses with side shields or chemical goggles to avoid skin and eye contact. If material penetrates to skin, change gloves and clothing. Hypersensitive persons should wear gloves or use protective cream.
HYGIENIC PRACTICES: Wash with soap and water before eating, drinking, applying cosmetics, or using toilet facilities. Use of a hand cleaner is recommended. Launder contaminated clothing before reuse. Leather shoes can absorb and pass through hazardous materials. Check shoes carefully after soaking before reuse.
APPLICATION: Use only in accordance with Carboline application instructions, container label and Product Data Sheet.

SECTION IX - SPECIAL PRECAUTIONS:

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORAGE: Keep away from heat, sparks, open flame, and strong oxidizing agents. Keep containers closed. Store in cool, dry place with adequate ventilation. If pouring or transferring materials, ground all containers and tools.
OTHER PRECAUTIONS: Do not weld, heat, cut or drill on full or empty containers.

The information contained herein is, to the best of our knowledge and belief accurate. However, since the conditions of handling and use are beyond our control, we make no guarantee of results, and assume no liability for damages incurred by use of this material. It is the responsibility of the user to comply with all applicable federal, state, and local laws and regulations.

PRODUCT: CARBOGUARD 890 ALUMINUM PT A (0986A1AL)
Date: 02/12/03 Replaces 11/10/99

Carboline Company 350 Hanley Ind. Ct. St. Louis, MO 63144
PHONE NO. 314-644-1000 FOR INDUSTRIAL USE ONLY

CARBOLINE CO. MATERIAL SAFETY DATA SHEET
PRODUCT: CARBOGUARD 890 ALUMINUM PT A (0986A1AL)
Date: 02/12/03 Replaces 11/10/99

SPECIFIC STATE REGULATORY INFORMATION

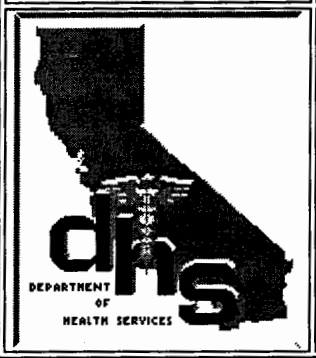
NEW JERSEY
PENNSYLVANIA
Non-Hazardous Materials above 1 Percent:

Name	CAS	Pct
EPOXY RESIN	25036-25-3	20%
EPOXY RESIN	67924-34-9	15%

CALIFORNIA

WARNING: This product contains a chemical(s) known to the State of California to cause cancer, and birth defects or other reproductive harm.

Revised June 1989

Fact Sheet	
	**Hazard Evaluation System and Information Service** 1515 Clay St., Suite 1901 Oakland, CA 94612 (510) 622-4317

Epoxy Resin Systems

(two or more chemicals combined to form epoxy paint, plastic, or adhesive products)

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Health Hazard Summary: ***The most common effects of overexposure to the chemicals used in epoxy resin systems are eye, nose, throat, and skin irritation, skin allergies, and asthma. Chemicals in some epoxy resin systems have additional health effects. Finished, hardened epoxy products are practically non-toxic unless they are cut, sanded, or burned.***

Are You Working With an Epoxy Resin System?

Epoxy products are used for paints and other surface coatings, molded and reinforced plastics, electronic component potting resins, and adhesives ranging from spray foams to dental cement. They are often used in jobs where tough, durable coatings or adhesives are needed. This factsheet is for workers who use epoxy products in a variety of workplaces, including shipyards, auto body shops, and the electronics, aerospace and construction industries.

What Is In an Epoxy Resin System?

Epoxy resin systems are made up of an epoxy resin and a curing agent (also called a hardener or catalyst). Many epoxy products also contain additives such as organic solvents, fillers such as fiberglass or sand, and pigments. See the box on page 2.

When epoxy resin systems are used, single molecules (monomers) of the epoxy resin chemical and the curing agent combine to form long chains of molecules (polymers). As the mixture "cures," it becomes a hard polymer. Some epoxies cure in a few minutes at room temperature. Others need additional time or heat to harden. The characteristics of hardened epoxies (such as whether they are firm or flexible, or resistant to heat or chemicals) depend on which epoxy monomers, curing agents, solvents, and fillers are added.

The hardened, finished polymers are almost non-toxic; it is exposure to the uncured resin components that can be harmful. In a two-component epoxy product, the epoxy resin and the curing agent are packaged separately and must be mixed together just before being used. Each component can be hazardous. In a single-component product, the resin and the curing agent are supplied in a pre-mixed form. Single-component systems are usually safer, because the hazardous chemicals are already partly combined into less toxic polymers and because they do not evaporate into the air as easily.

You Have the Right to Know: Under California's Hazard Communication Standard (GISO 5194), your employer must tell you if you are working with any hazardous substances, including epoxies, and must train you to use them safely.

Because different additives to epoxy resin systems can affect your health in different ways, you should find out what chemicals are in the products you use. Ask to see the Material Safety Data Sheets (MSDSs) for the products in your work area. An MSDS lists the hazardous chemical contents of a product, describes its health and safety hazards, and gives methods for its safe use, storage, and disposal. The MSDS should also include information on fire and explosion hazards, reactivity, first aid, and procedures for handling leaks and spills. Your employer must have an MSDS for any workplace product that contains a hazardous substance, and must make the MSDS available to employees on request.

This Fact Sheet is an aid for worker training programs. It does not take the place of Material Safety Data Sheets. HESIS Fact Sheets are available for several of the chemicals commonly added to epoxy resin systems; see page 6.

Examples of Epoxy Resin System Chemicals

Epoxy Resins (monomers or oligomers) can be powders, or they can be thick, clear or yellow liquids. Some common epoxy resins are: the diglycidyl ether of bisphenol A (DGEBA), novolac resins, cycloaliphatic epoxy resins, brominated resins, epoxidized olefins, Epon^{R} and Epikote^{R}.

Curing Agents react with epoxy resin monomers to form epoxy products. They are

usually liquids with strong, unpleasant odors. There are several categories of curing agents. Examples include:

- ***Aliphatic amines*** such as triethylenetetramine (TETA) and diethylenetriamine (DETA);
  Aromatic amines, including diaminodiphenyl sulfone (DDS) and dimethylaniline (DMA);
  Anhydrides such as phthalic anhydride and nadic methyl anhydride (NMA);
  Amine/phenol formaldehydes such as urea formaldehyde and melamine formaldehyde;
  Catalytic curing agents such as tertiary amines and boron trifluoride complexes.
  Diluents and solvents are used to dilute or thin epoxy resins. Diluents are usually clear liquids. Some examples are:
  Glycidyl ethers (reactive diluents) such as n-butyl glycidyl ether (BGE), isopropyl glycidyl ether (IGE) and phenyl glycidyl ether (PGE);
  Organic solvents such as toluene (toluol), xylene (xylenol), acetone, methyl ethyl ketone (MEK), 1,1,1-trichloroethane (TCA), and glycol ethers.
  Fillers add bulk and body to epoxy products. They are usually powders or fibers such as sand, clay, calcium carbonate, fiberglass, asbestos, or silica.

HOW DO EPOXIES ENTER AND AFFECT YOUR BODY?

The chemicals in epoxy resin systems can affect your health when they come in contact with your skin, or if they evaporate or form a mist or dust in the air you breathe. The main effects of overexposure are irritation of the eyes, nose, throat, and skin, skin allergies, and asthma. The solvent additives can cause other effects such as headaches, dizziness, and confusion.

Lungs: Vapors and spray mists of most epoxy resin system chemicals can irritate your lungs. Some people develop asthma from the curing agents. Symptoms of asthma include chest tightness, shortness of breath, wheezing, and coughing. These symptoms may occur after work or at night. Once a person becomes allergic to curing agents, even the dusts from sanding or grinding the hardened plastics can cause an asthma attack.

Skin: Epoxy resins can cause skin irritation. Symptoms include redness, swelling, flaking, and itching on the hands, face, or other areas of contact. Some people develop a skin allergy or sensitivity to epoxy liquids or mists. Skin allergies may develop after just a few days of contact or after many years of exposure to epoxies. Sensitized skin may become red, inflamed, blistered, and itchy even from brief contact with epoxy resins.

Eyes, Nose, and Throat: Most epoxy resin system chemicals and their vapors (especially the curing agents and solvents) can irritate your eyes, nose, and throat. Some people develop headaches as a result of this irritation. If the liquids are splashed into your eye they will sting, and they can severely damage the eye. In case of eye contact, immediately rinse the

eyes with water. Continue rinsing for 15 minutes and then seek medical attention.

Nervous System: Solvents inhaled or absorbed through your skin can affect your central nervous system (your brain) the same way drinking alcohol does. Symptoms of solvent overexposure include headache, nausea, dizziness, slurred speech, confusion, and loss of consciousness. For more information, ask for the HESIS Guide to Industrial Solvents.

Cancer: Older epoxy resins caused skin cancer in laboratory animals. This may have been due to epichlorohydrin, a contaminant that can probably cause cancer in humans. Most newer epoxy resins, which contain less epichlorohydrin, do not seem to cause cancer in animals.

Diaminodiphenyl sulfone (DDS), a curing agent in some epoxy resin systems, is carcinogenic in laboratory animals. Certain glycidyl ethers used in epoxy products cause genetic mutations in laboratory animals. This suggests that they may be cancer-causing agents. It is not known if glycidyl ethers cause mutations or cancer in humans. Most other components of epoxy resin systems have not been adequately tested to determine if they can cause cancer.

Reproductive System: Epoxy resins and curing agents themselves probably do not affect pregnancy and reproduction in humans. However, some of the diluents and solvents in epoxy resin systems may affect reproduction. Two solvents sometimes found in epoxy resin systems (2-ethoxyethanol and 2-methoxyethanol) cause birth defects in laboratory animals and reduced sperm counts in men. Some glycidyl ethers also damage the testes and cause birth defects in test animals. It is not known whether they have the same effects in humans.

Most other solvent additives have not been adequately tested to determine if they affect reproduction. However, we do know that solvents inhaled by a woman can reach a developing fetus and may contaminate the woman's breast milk. They may affect the fetus just as they affect the mother. We recommend that pregnant and nursing women minimize their exposure to solvents, just as they should minimize their exposure to alcohol.

Find out which chemicals are in the epoxy resin system you use. Epoxy resin systems that contain hazardous solvents and diluents can be replaced with safer ones. See the section on "Reducing Your Exposure" on page 5.

TESTS FOR EXPOSURE AND MEDICAL EFFECTS

There is no medical or laboratory test that can accurately measure the amount of epoxies in your body. Most of the chemicals found in epoxy resin systems are not stored in the body. However, it is generally recommended that workers who are frequently exposed to epoxy resin systems receive a complete physical examination, including an occupational and medical history and a pulmonary function test (spirometry), at the beginning of their employment. A spirometry test measures how well your lungs work. Spirometry can be

performed before and after the same work shift to determine whether lung function is affected by work activities. Spirometry is also a recommended part of the medical evaluation before respirator assignment. A spirometry factsheet for workers is available from HESIS.

People who work with epoxies on a regular basis should also have annual follow-up examinations, including skin examinations and spirometry. A doctor or other health care provider can choose other specific tests on a case-by-case basis to evaluate effects of chemical exposure. Patch testing can be performed for the diagnosis of skin allergies. If you are sensitized to a chemical, the doctor will see a reaction on your skin within a few days of the test.

You have the right to see and copy your own medical records and records of your exposure to toxic substances. These records are important in determining whether your health has been affected by your work. Employers who have such records must store them and make them available to you for at least 30 years after the end of your employment.

LEGAL EXPOSURE LIMITS

California's Division of Occupational Safety and Health (Cal/OSHA) sets and enforces workplace chemical exposure limits. Cal/OSHA has adopted Permissible Exposure Limits (PELs) for the amounts of some, but not all, of the epoxy resin system chemicals that may be in the air you breathe.

Legally, your exposure may be above the PEL value at times, but only if it is below the PEL value at other times, so that your average exposure for any 8-hour workshift is not greater than the PEL for that chemical. See the box below.

If you work with epoxy resin systems and think you may be overexposed, talk to your supervisor and/or your union. If any worker might be exposed to a substance at more than the legal exposure limit, the employer must measure the amount of the chemical in the air in the work area (Cal/OSHA regulation GISO 5155). You have the right to see the results of such monitoring relevant to your work (GISO 3204).

Legal Exposure Limits for Some Epoxy Resin System Chemicals* Chemical Name	Cal/OSHA PEL
n-butyl glycidyl ether (BGE)	25 ppm
isopropyl glycidyl ether (IGE)	50 ppm
phenyl glycidyl ether (PGE)	1 ppm
diethylenetriamine (DETA)	1 ppm

toluene	100 ppm
xylene	100 ppm
2-ethoxyethanol	5 ppm
2-methoxyethanol	5 ppm
methyl ethyl ketone	200 ppm
phthalic anhydride	1 ppm
* PELs are measured as parts of chemical per million parts of air ("ppm").	

REDUCING YOUR EXPOSURE

Your employer is required to protect you from being exposed to any chemical at levels that are above the PEL. For information about how Cal/OSHA and Cal/OSHA Consultation Service can help you and your employer, see the "Resources" section on page 6.

Substitution: The most effective way to reduce hazardous chemical exposures is to use a safer chemical, if one is available. For example, you or your employer may be able to choose an epoxy resin system that:

- contains little or no residual epichlorohydrin (a contaminant that causes cancer in experimental animals and possibly in humans). Check the MSDS to see how much epichlorohydrin is in the resin you use.
- is hardened with curing agents that are less irritating than the simpler aliphatic chemicals. For example, polyamides and cycloaliphatic amines are generally less irritating than other curing agents. (Your supervisor or the manufacturer or supplier of the product can tell you which type is contained in the epoxy system you use).
- contains high-molecular-weight resins. Resins with higher molecular weights are less likely to sensitize the skin. (Ask your supervisor or chemical supplier about molecular weights.)
- has a reduced-solvent content or is solvent-free, to minimize health effects due to solvents.
- is a single-component epoxy system. These are usually safer than two-part products because the hazardous monomers are already partly reacted.
- does not contain asbestos, fiberglass, or silica fillers in a dry form. These substances can cause severe lung diseases if you breathe their dusts. Do not sand or grind hardened epoxies that contain these substances. Avoid products that contain asbestos.

The health and safety hazards of substitutes must be carefully considered to ensure that they are actually safer.

Engineering Controls: When feasible, employers must use engineering controls rather than personal protective equipment to prevent overexposures. Engineering control methods include installing ventilation, changing the work process, and changing work practices.

- Containers and vats of epoxy resins and solvents should be tightly covered to prevent evaporation.
- Local exhaust ventilation systems ("hoods") are the most effective type of ventilation control. These systems capture contaminated air at its source before it reaches your breathing zone.
- Heating epoxies during curing or any other process can cause chemicals to evaporate (turn into gases) more quickly. The higher the temperature, the greater the amount of chemical released into the air you breathe. Use the lowest possible curing temperatures, avoid heating epoxies unnecessarily, and be sure that adequate ventilation is used when epoxies must be heated or when the curing reaction generates heat.
- Certain work processes, such as heat-curing of epoxy resin systems, can be isolated, enclosed, or automated to reduce exposures.
- Electrostatic spray systems can reduce the amount of workplace contamination and waste from spray-on epoxy resin system chemicals.

Personal Protective Equipment: When engineering controls cannot sufficiently reduce exposures, a respirator must be worn and a respiratory protection program must be developed, as outlined by Cal/OSHA regulations (GISO 5144). An industrial hygienist or other knowledgeable person should be consulted to ensure that the equipment is appropriate and is used correctly. In some cases a supplied-air respirator may be required.

If frequent or prolonged skin contact with epoxy resin systems is unavoidable or if splashing may occur, protective equipment such as gloves, goggles, or faceshields should be worn. Protective clothing should be made of a material that will protect you from the chemicals in the epoxy resin system you use. Butyl rubber is resistant to some of the chemicals commonly used in epoxy resin systems, while polyvinyl alcohol is resistant to others. Glove materials must be evaluated on an individual basis for each specific product.

Personal Hygiene: Remove clothing contaminated with epoxy resin system chemicals and immediately wash off any epoxies that get on your skin. Pay particular attention to your fingernails and the area around the nail bed.

Dry or irritated skin can absorb chemicals and become sensitized to epoxies more easily than healthy skin. Use soap and water or a commercial hand cleaner. Don't use solvents to

clean your hands; they remove the natural protective oils from your skin and leave your skin dry and irritated. After washing, use a skin conditioner or lotion to help keep the skin on your hands in good condition.

International Construction Services, Inc.
P. O. Box 5206
Fair Oaks, CA 95628-9104
Phone: (916) 989-6720 • Fax: (916) 989-6750
E-mail: billsnug@aol.com

June 21, 2005

Noble Consultants, Inc.
359 Bel Marin Keys Blvd. Ste #9
Novato, CA 94949-5637

Attention: Ron Noble, P.E.

Reference: Seadrift Lagoon Bulkhead Improvement Project

Subject: Steel Sheet Piling

Dear Mr. Noble;

Unprotected steel sheet piling in a marine environment will corrode. That said, there are many varying factors that control the rate of corrosion. The salinity, temperature, oxygen levels, organisms and original strength and thickness of the steel all play a part in the rate of corrosion deterioration. The lower the first four items and the higher the last two are the best of both for corrosion resistance. Most studies of piling deterioration in seawater have been done in either warmer salt water than found in the Lagoon or colder seawater than likewise is found in the Lagoon. Since freshwater deterioration is about half of the saline number, any freshwater intrusion into the Lagoon is a good thing for slowing the rate of corrosion. Since the sheet piling is only twenty percent exposed on the front side and zero exposed to the seawater on the back side, and since the soil in the area has been shown to be fairly non toxic (Corrosive) the most likely area to encounter corrosive conditions are the exposed front three feet of the piling. Also, the exposed area does not suffer corrosion uniformly, but in localized spots (called anodes). Therefore if this letter is limited to the anode areas, it may be safely assumed that all other areas of the piling are better off, with respect to corrosion.

100% salt water under average conditions with no excessive factors i.e. higher than normal oxygen levels and an unduly large splash zone as a percentage of the piling, may conservatively suffer a loss of mild steel at the rate of 4 to 5 mils per year localized in the anode areas. By adding in factors like some fresh water intrusion, Grade 50 steel (High Strength) and moderate temperatures, the rate may be adjusted to from 3.5 to 4.5 mils per year. For a piling section that is 216 mils thick (uniformly) that would translate to a localized only erosion of 48 to 62 years before a small hole may appear in the steel, while the rest of the piling is continuing to act as the bulkhead that it is.

By adding a protective coating to the exposed surfaces of the piling (such as Carboline 890) the life of the structure can be greatly enhanced. When applied properly with 2 ea coats at 6-8 mils DFT, the coating acts to enhance the life of the piling by 15 yrs or more. Harsh environment loss of coating is about at the rate of 1 mil per year (localized and not all over) and a single coat only would add 6 to 8 years before some area of the piling would be exposed to corrosion. Since 16 mils of coating are specified by the design engineer, (2 coats) it can be seen that about 16 years can be added to the useful life of the piling by the addition of this coating. It should also be pointed out that a very simple, non environmentally damaging, repair procedure can be applied to areas that may suffer impact damage, etc. thereby adding even more life to the coating and piling.

EXHIBIT NO. 8
APPLICATION NO. 2-03-013
SEADRIFT ASSOC. & KYRA INGEMANSSON
Ltr. from William Carp to R. Noble

(Page 1 of 2)

It does not require much imagination to see that once coated and installed correctly, under total neglect the minimum useful life of localized areas would be fifty years or more and for the largest percentage of the piling the useful life is probably between sixty-five and ninety years. Minor repairs to small areas as they occur will add innumerable years to the life of the project.

Thank you for allowing us to respond to your inquiry. Please call with any questions.

Very Truly Yours,

International Construction Services, Inc.

William L. Carp
Western Region
Authorized Representative

Site Photograph #1

EXHIBIT NO. 9
APPLICATION NO. 2-03-013
SEADRIFT ASSOC. & KYRA INGEMANSSON
(1 of 3) Site Photographs

Site Photograph #2

Site Photograph #3