ABSTRACT

The Former Scott Paper Mill site at the Port of Anacortes, Washington State, USA was the location of lumber and paper manufacturing facilities for nearly 100 years. Historic industrial activities at the site contaminated upland soil, groundwater and marine sediments with petroleum-related compounds, dioxins/furans, PCBs, metals and wood waste. The project was a focal point for the Port of Anacortes and the Port sought to increase the public value of the land and provide significant improvements to the shoreline, public access and habitat while meeting the basic cleanup requirements for the site.

In late 2005, Washington’s Governor and the state legislature created the Puget Sound Initiative to clean up, preserve and restore Puget Sound by 2020. After ascertaining that Model Toxics Control Act (MTCA) funding could expedite the Port’s clean-up and redevelopment efforts, GeoEngineers recommended that the Port develop and implement a comprehensive cleanup strategy that would address their contaminated sites. In mid-2011 the Port celebrated the re-opening of the Seafarers’ Memorial Park and the completion of the former Scott Paper Mill clean-up project – the largest project in their comprehensive cleanup programme. This project was the recipient of the 2012 Environmental Excellence Award at the Western Dredging Association (WEDA) meeting in San Antonio, Texas in June 2012. The article here provides further details about the project at the Former Scott Paper Mill site.

INTRODUCTION

The community of Anacortes, Washington State (USA) is located on Fidalgo Bay in north Puget Sound, about 65 miles from Seattle (Figure 1). The Port of Anacortes currently owns multiple properties along Fidalgo Bay and the Guemes Channel that were historically used for industrial purposes that left behind toxic pollutants in the upland areas and shoreline sediments.
In late 2005, Washington’s Governor Christine Gregoire and the state legislature created the Puget Sound Initiative to clean up, preserve and restore Puget Sound by 2020.

GeoEngineers recognised that the State’s initiative offered potential Model Toxics Control Act (MTCA) funding that could expedite the Port’s clean-up and redevelopment efforts. With the potential funding stream in place, GeoEngineers recommended that the Port develop and implement a comprehensive cleanup strategy that would address their contaminated sites.

The Port’s targeted sites include a boatyard and marine fueling facility, a former bulk fuel storage facility, a former log haul out facility, a former lumber and paper mill and an operating shipyard facility. In response to the recommendations, the Port engaged GeoEngineers’ team to work collaboratively with the Washington State Department of Ecology (Ecology) to develop its “Focus Fidalgo” environmental stewardship programme, a comprehensive environmental framework that the Port utilises to coordinate the expedited clean-up efforts on Port properties – in partnership with Ecology.

GeoEngineers is providing a full suite of services to the Port of Anacortes as part of their comprehensive cleanup programme, including strategic planning, site investigation, cost modelling and clean-up design, construction management and expert witness. Prior to the Former Scott Paper Mill cleanup, GeoEngineers had completed work for two other Port sites – Cap Sante Marine (Figure 2) and the Dakota Creek Industries marine area.

**THE FORMER SCOTT PAPER MILL SITE**

The Former Scott Paper Mill site at the Port of Anacortes was the location of lumber and paper manufacturing facilities for nearly 100 years. Historic industrial activities at the site contaminated upland soil, groundwater and marine sediments with petroleum-related compounds, dioxins/furans, PCBs, metals and wood waste.

The project was a focal point for the Port of Anacortes, and the Port sought to increase the public value of the land and provide significant improvements to the shoreline, public access and habitat while meeting the basic cleanup requirements for the site. GeoEngineers worked with the Port to develop an integrated cleanup strategy that included a creative cost-recovery approach to provide funding, agency partnership to provide dedicated project oversight and an aggressive schedule to minimise overall project cost and risk.

The cleanup and restoration of the Former Scott Paper Mill was a three-year, $37 million project. The Port completed work on the project in partnership with Ecology and the Kimberly-Clark Corporation, successor to the mill’s former owner. The project resulted in the cleanup and restoration of the site, enabling the Port to contribute significantly to their environmental stewardship efforts within Fidalgo Bay and return a popular section of the waterfront to safe public use.

The Port of Anacortes’ project team included GeoEngineers as the environmental consultant...
JOHN HERZOG received a BS in Oceanography from the University of Washington (1989) and an MS (1993) and PhD (1995) in Geological Sciences from the University of Colorado. With more than 15 years of experience in remedial design, strategy development and environmental management, he has managed a broad range of waterfront-related projects, especially those with issues related to contaminated sediments, remedial design and construction, geotechnical characterisation and upland redevelopment. His expertise encompasses dredged material management, sediment evaluation and cleanup, nearshore soil and groundwater evaluation and cleanup, and habitat restoration projects, with a comprehensive understanding of the regulatory issues related to marine sediment remediation, remedial design and construction processes and geotechnical analyses.

ENVIRONMENTAL BENEFITS
The 41-acre Former Scott Paper Mill site is located on the west shore of Fidalgo Bay in downtown Anacortes. The site, which has approximately 2,000 feet of waterfront frontage, was used for industrial purposes from around 1890 to 1979, resulting in severe contamination of the upland soil and groundwater and marine sediments (Figure 3).

Though industrial activities had been discontinued for decades, the property remained contaminated and the potential costs of complete remediation and lingering technical and legal issues stalled any efforts to redevelop the site.

Under the Port’s Focus Fidalgo environmental programme, which takes an integrated approach to removing contaminants, restoring aquatic habitat and improving public facilities along the waterfront, the Port began working with GeoEngineers in 2007 to determine how it could remediate the site and recover the costs associated with the project.

The Former Scott Paper Mill site was not only the largest of the Port’s Focus Fidalgo projects, but was the largest and most comprehensive shoreline and sediment cleanup completed in Washington under Model Toxics Control Act (MTCA) and Ecology’s Puget Sound Initiative (Figure 4).

Its innovative combination of cost recovery, aggressive schedule and collaborative approach advances the state of the art for remediation efforts throughout Puget Sound and inland waterways elsewhere in the country.

The Former Scott Paper Mill project resulted in the cleanup and restoration of the site, enabling the Port to improve the environmental health of the region, return the site to safe public use and provide an unmatched example of how to effectively and efficiently expedite major cleanup projects.

The Port achieved the following environmental outcomes for the project:

• Cleaned up the site soil, groundwater, sediment and wood debris to the highest environmental standard required by Washington State regulations to ensure protection of human health and the environment.
• Successfully dredged and disposed of contaminated sediment at the site and backfilled with dredged material from an adjoining channel to create eelgrass habitat (see dredging details under “Innovations and Beneficial Uses” below).
• Created new shoreline habitat in a formerly degraded portion of the bay.
• Replaced an existing failing federal breakwater with a new structure that will facilitate better water circulation while protecting the newly remediated shoreline and adjacent marina facility.

INNOVATIONS AND BENEFICIAL USES
The Former Scott Paper Mill site is the largest of five projects that integrate remediation, habitat restoration, redevelopment and public access improvements into a single and coordinated effort. The project was divided into four phases to accommodate ongoing site uses and construction sequencing and included technical highlights which are described below.
Complex dredging and disposal logistics
Approximately 54,000 cubic yards of sediment, wood, and debris were dredged at the Site for open water and upland disposal and 37,000 cubic yards of material were dredged from a nearby navigation channel and used on site as fill to create eelgrass beds at the site. Dredging was completed by Pacific Pile and Marine using a barge-mounted Hitachi 1200 with buckets and location control equipment especially adapted for marine construction (Figure 5).

Dredged materials that were determined to be not suitable for open-water disposal were offloaded at a pier-side processing facility and prepared for transport to an upland landfill facility. Approximately 21,000 cubic yards of material were eligible for open-water disposal at the Port Gardner, Washington open water disposal site. This is about a 12 hour round trip by barge from the site. The dredged material contained significant amounts of wood that periodically fouled the bottom dump barge. A sediment-processing facility was constructed to effectively remove the wood debris before returning it to a barge for open-water disposal and to process the contaminated dredged material that was brought directly to the landfill. Approximately 37,000 tonnes of contaminated sediment and wood debris were processed and transported by truck for landfill disposal.

Creative waste-stream management
Contractors excavated approximately 93,000 cubic yards of contaminated soil, sediment, wood and debris from upland areas for landfill disposal. Crews offloaded the upland material and parts of the dredged material to a sorting facility at a nearby marine terminal where they used screening machines to separate the wood and rock from the fine-grain sediments and amended the contaminated material for shipment. Rock reclaimed from the materials-sorting process was returned to the site for use as backfill, effectively lowering the overall disposal and materials purchase costs (Figure 6). Contaminated wood debris was separated and dried prior to transport to the landfill, effectively lowering the overall weight and saving on the disposal costs.

Habitat elements
A multi-acre offshore eelgrass habitat was created using dredged material from an adjacent channel and eelgrass salvaged from the site prior to construction. Also, the beach was softened for fish habitat by backfilling dredged areas with clean sand and gravel (Figure 7). A shoreline riparian area comprising native trees and shrubs was created to enhance the fish spawning habitat.
Overcoming site constraints
Shallow water around the entire marine area of the site required the team to carefully coordinate offshore construction activities around tide conditions. The project required extensive shoring to allow the shoreline excavations to be completed outside of the in-water work window and to assist dewatering. The team constructed wave attenuation structures offshore to control future erosion at the site. The project was also subject to intensive water-quality restrictions to prevent contaminant loss from the site. No water quality exceedances were measured throughout the duration of the project.

Data management and sharing
GeoEngineers developed an internet-based GIS system that was accessible by the multiple involved parties and allowed the project team to view construction progress data in real time, enabling efficient and sound decision making capabilities throughout the life of the project. The online system provided an effective mechanism for inspecting the offshore dredging, disposal and rock building work relative to the contract drawings.

ECONOMIC BENEFITS
The Former Scott Paper Mill project is notable for the creative and efficient strategy that the Port, GeoEngineers and Ecology used to address the cleanup challenge. This successful approach included a number of economic, cost-saving and community benefits.

Figure 7. The beach was softened for fish habitat by backfilling dredged areas with clean sand and gravel.

Cost recovery
The Port had envisioned cleaning up the Former Scott Paper Mill site for many years, but the cost of fully remediating the contamination was prohibitive. The Port was successful at recovering the majority of its costs for the Former Scott Paper Mill cleanup through third-party funding and Ecology grants while maintaining desired land uses and redevelopment plans.

Aggressive schedule
One of the greatest threats to the health of Puget Sound is contamination that leaches into the water and sediments from historical industrial sites. This has been a pressing issue for decades, but most landowners lacked the financial and technical resources to clean up and redevelop these properties.

The project team and Ecology set an aggressive schedule for the site cleanup with the goal of creating a new model for cost and administrative efficiency on large cleanup projects. Crews kept the project on schedule and on budget by running 24 hours a day, seven days a week, when necessary (Figure 8). GeoEngineers led the efforts to successfully complete the Remedial Investigation, Feasibility Study, Draft Cleanup Action Plan, remedial design, permits and contract bid packages for this approximately $37 million cleanup project in about 36 months. By comparison, the Department of Ecology had reported that the average cleanup project of this nature can take up to 15 years to complete.

Contracting
The marine construction work was completed within the anticipated project schedule without significant non-owner directed change orders.

Figure 8. Crews kept the project on schedule and on budget by running 24 hours a day, seven days a week, when necessary.
dredging adjacent navigation channels for beneficial-use materials provides a solid example of how cost efficiencies and recycling can be applied with careful planning.

OUTREACH AND EDUCATION

Throughout the project, the Port participated in an educational outreach programme that provided training and study areas for the Anacortes School District and undergraduates attending Western Washington University, as well as providing a summer engineering intern position at the site. During the project, the Port provided workshops to multiple regulatory agencies to show the in-field application of innovative stormwater management and other best management practices. In addition, the Port held regular community tours and other community interest updates, and has provided educational interpretive signage along the new esplanade.

As a result of the Scott Paper Mill project and related cleanup efforts on Focus Fidalgo, the Port has embraced environmental stewardship as central to its mission, and the agency now enjoys a highly favorable relationship with the Anacortes community and is developing a regional and national reputation as an environmental leader.

The use of relatively small scale water- and land-based equipment in coordination with tidal windows demonstrated how close coordination of the engineering and construction elements can achieve successful results in draft-limited environments.

The sediment processing system established as part of the project serves as a model for efficient materials handling. Reclaiming usable materials from the dredged material and Community impact

In addition to the environmental benefits of this major cleanup effort, the Former Scott Paper Mill project has had tremendously positive impact on the Port and City of Anacortes. The Port went beyond the basic cleanup requirements and made significant improvements to the public access to the waterfront via the Seafarers Memorial Park, which includes a shoreline esplanade, restored beach, shoreline habitat areas, a pier and dock for small boats (Figure 9).

Businesses were able to operate without significant disruption throughout the project and now benefit from improved infrastructure and access. Additionally, construction activities contributed millions of dollars to the local economy through purchase of goods and services and provided employment to a number of local workers.

Transferrability

This combination of cost recovery, aggressive timeframe and collaborative approach resulted in a successful model that is transferrable to other sites, advancing the state of the art for upland and nearshore remediation efforts throughout Puget Sound and inland waterways elsewhere in the country. For instance, the project serves as an example of how to safely conduct a major marine and upland construction project. No safety incidents were recorded for the duration of the project.

The Former Scott Paper Mill project resulted in the cleanup and restoration of a large site, enabling the Port to improve the environmental health of the region, return the site to safe public use and provide an unmatched example of how to effectively and efficiently expedite major cleanup projects.

The project achieved the following key outcomes:

- Revitalised part of the Anacortes waterfront, delivering environmental, recreational and economic benefits to the Anacortes community.
- Cleaned up contaminated soil, groundwater, sediment and wood debris from a waterfront property in an important resource area.
- Used sophisticated dredging and marine construction approaches to both remove contaminated material and create new marine habitat.
- Successfully recovered the majority of the project costs and avoided expensive contract claims.
- Completed the project on a very accelerated schedule, helping to reduce overall costs and achieve regulatory approval.
- Provided significant economic stimulus to the State economy during a major economic downturn.
- The project was completed without a recordable health and safety incident.

In mid-2011 the Port, the contractors and the community celebrated the re-opening of the Seafarers’ Memorial Park and the completion of the Former Scott Paper Mill clean-up project.