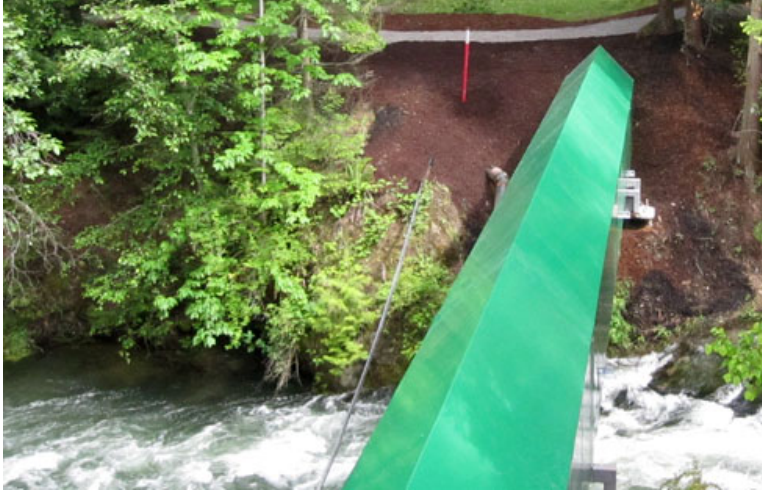


A project profile from geoengineers.com

Olympic Pipeline Span Protection

Innovative pipeline protection structure improves public safety; installation limits damage to park environment



GeoEngineers recommended installing a covered bulletproof steel truss to protect the 85-foot long exposed pipe.

Overview

Whatcom Falls Park, a 241-acre oasis in Bellingham, Washington, features native woods and recreational trails that city residents enjoy year-round. Olympic Pipe Line Company operates a 16-inch-diameter pipeline that crosses Whatcom Creek in the park and delivers fuel products from Ferndale, Washington to Portland, Oregon.

The pipeline ruptured in 1999, spilling more than 250,000 gallons of gasoline into Whatcom Creek. After the accident and ensuing mile-long fire, Olympic Pipe Line intensified its pipeline integrity and safety programs and worked to regain the community's trust.

Olympic was committed to preserving the beauty of Whatcom Falls Park and had concerns about the safety of the 85-foot-long section of exposed pipeline that spanned Whatcom Creek, approximately 25 feet above the creek surface. Large trees on nearby steep ravine banks posed a potential threat to the open pipeline span. Olympic and the City of Bellingham also felt that this unprotected span could be vulnerable to intentional or accidental gunfire.

Olympic engaged GeoEngineers to research and evaluate design alternatives to protect the pipeline span, including re-routing the pipeline under the creek, encasing it in steel or installing cables or mesh across the pipeline span. Site constraints that narrowed the range of feasible design solutions included very steep slopes, work areas adjacent to a stream and a fully operational petroleum-products pipeline, highly fractured bedrock with groundwater pathways connecting to the stream and limited access to the site.

The project team recommended a covered, bulletproof steel truss structure supported on drilled micropile foundations. The solution met Olympic's goals of preserving the park's scenic beauty by minimizing the footprint of the project area, minimizing disruption during construction and providing protection from tree fall or intentional harm to the pipeline.

GeoEngineers designed the innovative micropile foundations that supported the structure and minimized the project's final footprint by a factor of more than 10. Reid Middleton, a subcontractor to the project, designed the bulletproof, steel, covered truss to protect the pipeline from tree fall or gunfire.

Approach

Expert geo-scientific research, field measurement and analysis

- Evaluated subsurface conditions and conducted slope stability and critical-areas evaluations
- Analyzed how tree height, species, trunk diameter, breakage and other variables could affect different pipeline-protection designs in the event of an impact

Creative designs and inventive installation plan

- Evaluated and presented a range of design alternatives
- Designed a cost-effective, covered steel truss to ensure the integrity of the pipeline

EXPERTISE

- Geotechnical
- Permitting

MARKET

- Energy

LOCATION

- Bellingham, Washington

- Designed innovative micropilings to support the span, minimize construction impact at the site and reduce the project's environmental footprint

Knowledgeable collaboration with clients and stakeholders

- Collaborated with Olympic and project stakeholders on design details, fabrication and construction considerations and site constraints
- Engaged with the public in numerous ways, including attending Shoreline Committee meetings to respond to project questions, preparing public notices to publish in the newspaper and to distribute to park neighbors, answering construction site visitors' questions and working with the Parks Department to close park trails and post signage to inform park users about the project.

Start-to-finish support

- Obtained all environmental and building permits and provided construction observation, environmental compliance monitoring and communication with regulatory agencies throughout construction



Awards

ACEC-Washington, Silver award for Exceeding Client/Owner Needs, 2011

Results

- Determined the most cost effective design solution with the highest probability of success and the lowest impact to the park and creek
- Developed and followed a rigorous site-specific health, environment and safety plan, taking every precaution to minimize risk to worker safety, the pipeline and the environment
- Met and exceeded Olympic Pipe Line Company's goals of successful project completion, low site disturbance and worker safety



This conceptual design shows the internal structure of the truss.



Potential threats to the exposed pipeline (shown here, before construction) included tree fall or gunfire.



GeoEngineers designed micropile foundations (drilling shown here) that supported the structure and reduced its footprint.



Lowering the protective truss over the pipe



Truss after installation

Find this page online at:
<http://www.geoengineers.com/project/olympic-pipeline-span-protection>



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