

Go East Corp. Landfill

Public Meeting
June 18, 2020



Hello! Who's Here?



Alan Noell

Site Manager, Environmental Engineer

Tim O'Connor

Hydrogeologist

Nancy Lui

Outreach Specialist

Megan Rounds

WebEx moderator

Coleman Miller

Spanish Interpreter



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Alan and Tim are in the Solid Waste Management Program with Ecology. We're wearing two hats by supporting the Snohomish Health District with permitting of the landfill, and leading the implementation of the cleanup process under the Model Toxics Control Act.

Tim will be collect written comments during our meeting tonight, and moderate the question and answer session.

Nancy is our public outreach specialist, and just opened our presentation.

Megan Rounds is the host for tonight's meeting. Megan is also solid waste engineer, and is my counterpart in Ecology's Eastern Regional Office. If you have any technical issues please use the chat box and she will help you through this meeting

Coleman Miller is supporting this project as our Spanish interpreter.

Also Joining as Panelists



- Bruce Straughn
- Megan Engebretson
- Paul MacCready
- Ken Crossman
- Brian Dorsey



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We have representatives for Snohomish Health District and Snohomish County Planning & Development Services joining us tonight.

The intent of this public meeting is to discuss the cleanup process and how it relates to the existing permitting process. Many of the comments that we have received during this public comment period have dealt with development issues that are beyond the purview of the Department of Ecology. We will share these concerns with Planning and Development Services and the property owner.

Also joining us tonight are representatives of the property owner, P&GE, and their consultant GeoEngineers.

Agenda



Presentation

- Site history
- Development plans
- Permits
- Cleanup process
- How to comment and stay informed
- Questions & answers



Image Icons: Gregor Cresnar (presentation) and Alice Design (meeting) from Noun project

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I want to cover the site history, development plans, permits, and cleanup process.

We're currently 6 weeks in the public comment period, and have extended the comment period until June 28. I want to cover how to submit comments and stay informed beyond the public comment period.

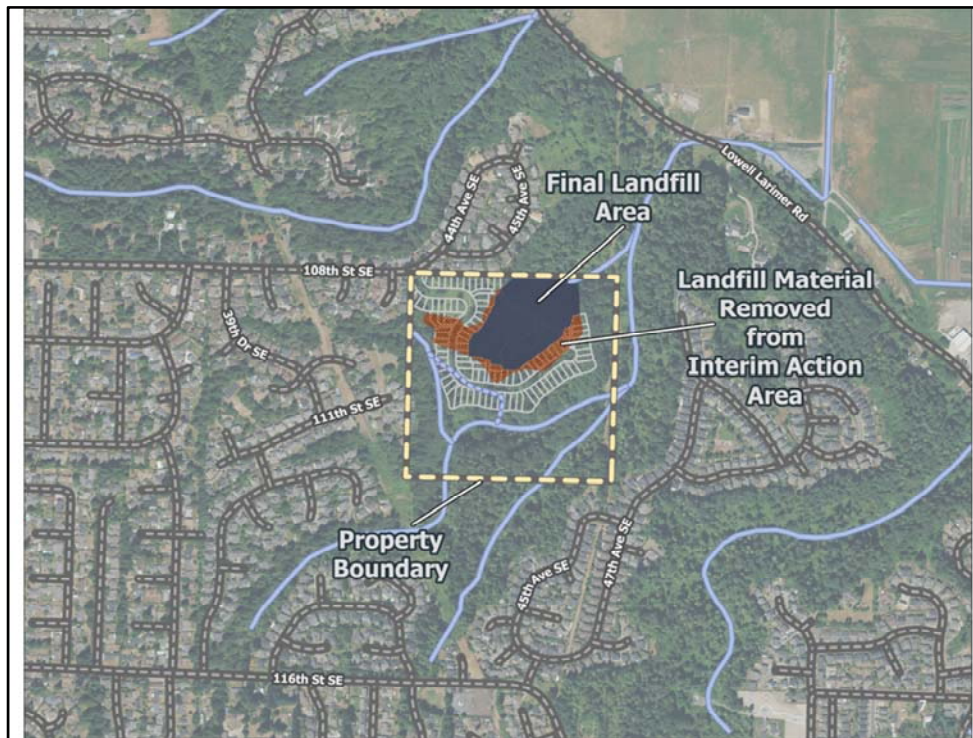
We're going to take a quick break before the Q&A session. I'll lead the Q&A session by responding to some frequently asked questions that have been submitted. After a short break, Tim O'Connor will then moderate a Q&A session, starting with questions that are submitted during this presentation. We want to be able to address your questions, so we'll plan to stay late tonight.



Site History



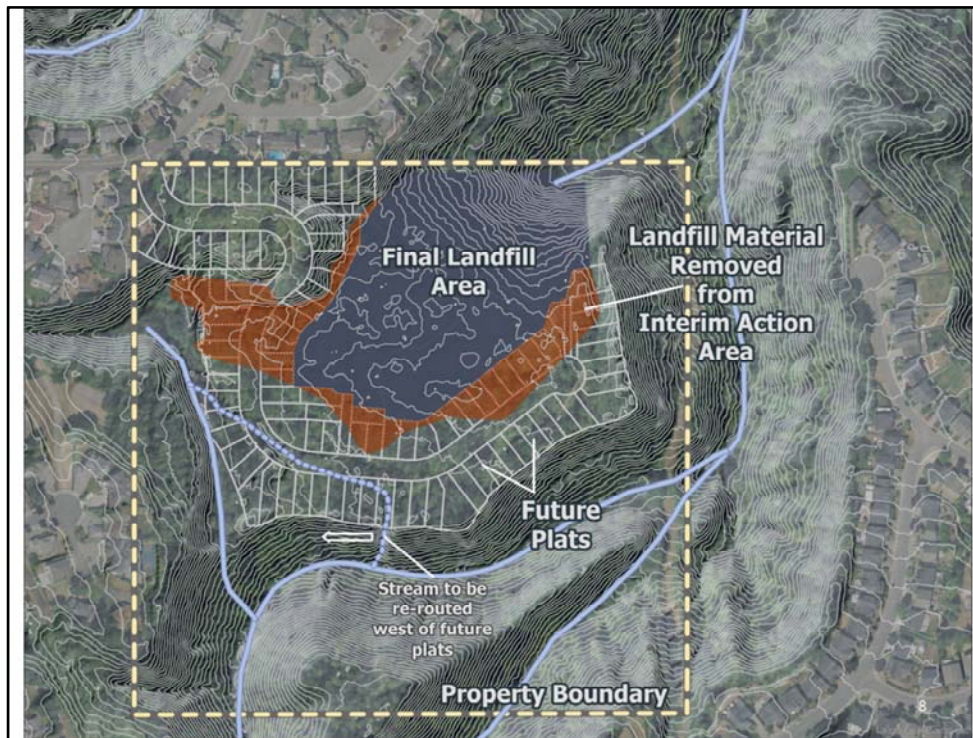
The cleanup site is located in unincorporated Snohomish County, south of Everett. The site property is a non-divided, 40-acre quarter-quarter section from Public Land Survey System. The residential areas near the site are on a plateau about 250 feet above the Snohomish River valley. The residential neighborhoods generally sit on Vashon till, which is underlain by about 100 feet of sand and 100 to 200 feet of a low permeability silt formation, which outcrop along the escarpment above the Snohomish River valley.



We're zooming into the Site on this slide. We'll get into the Site detail on the next slide. Most of these houses sit atop the Vashon till formation. The streams originate from groundwater draining from the Advance Outwash sand formation. Stormwater from the residential areas also discharges to surface water.

I'll point of the surrounding neighborhoods here.

- 108th Street Point Subdivision (north of site)
- Kings Ridge Subdivision (west of site)
- Waldenwood West Subdivision (south of site)
- Pinehurst at Waldenwood Subdivision (east of site)

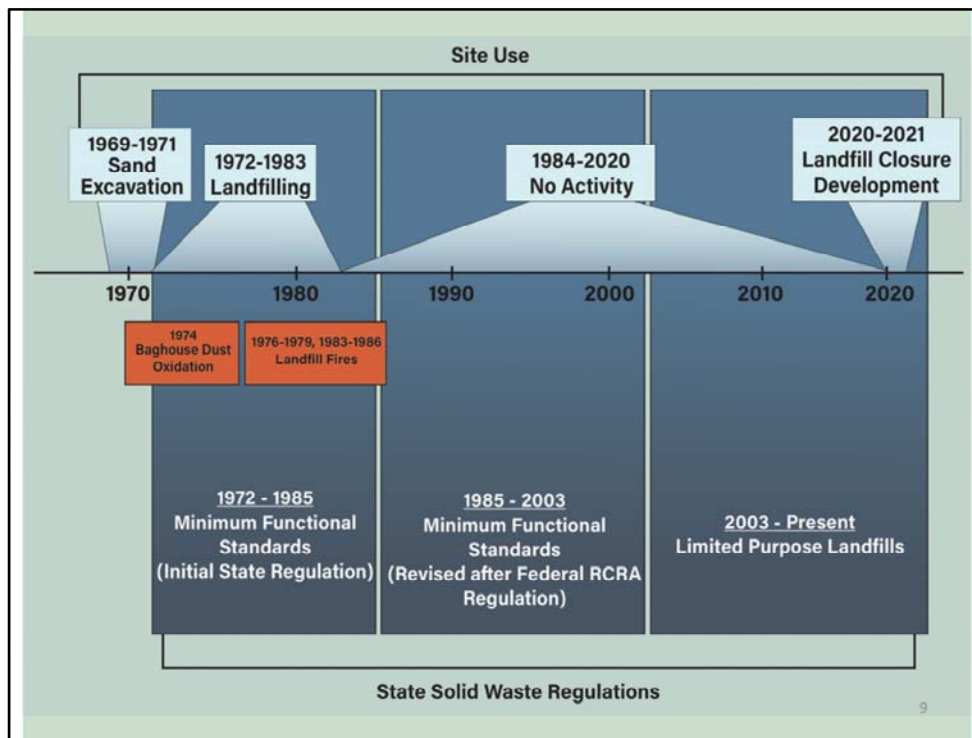


This slide shows elevation contours so that I can describe the landfilling process.

Sand was mined from this ravine from 1969 to 1971. In 1972, Rekoway began reclaiming this ravine with a permitted landfill, and landfilling operations continued until 1983. The current landfill includes both the gray and orange shaded areas. The landfill is deepest in the middle of the ravine, and was closed with a steep slope on the northeast side.

The stream that flowed through this ravine was re-routed along this dotted line to discharge to this stream to the south. Groundwater from the sand formation naturally drainages into these ravines, including from toe from the landfill. Because groundwater drains in both directions, there's limited groundwater recharge toward the eastern point, and the presence of groundwater is expected to be limited.

We'll discuss development later, but P&GE is planning to excavate the shallower peripheral areas of the landfill and place the landfill material in the center of the landfill. Sand will then be excavated from the west hill slope and the entrance area and used as fill for the orange area, which is called the interim action area or wedge area, and used for the final landfill cover. The stream will be relocated to the west making room for the development of future plats.



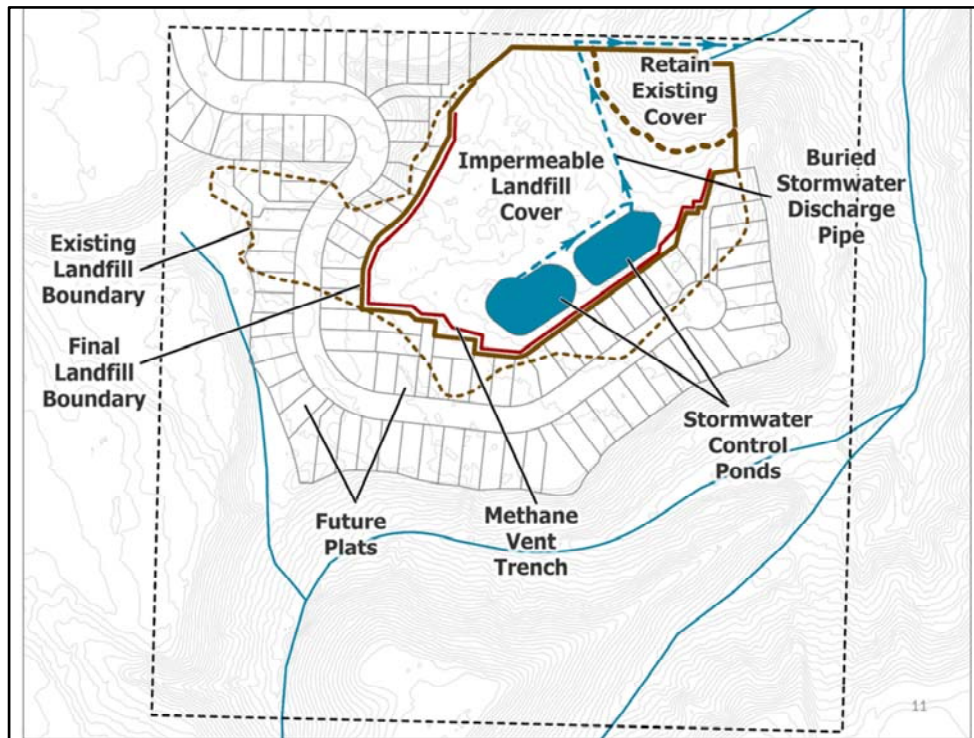
In this slide, I want to describe how the landfilling activities coincide with the state landfill regulations. Snohomish Health District has permitted this landfill since its beginning. Before 1972, the health district regulated landfills based on county regulations. The landfill operated when the initial state regulations (WAC 173-301) were enacted, which have limited closure standards, require only 5-years of post-closure maintenance, provide no specific monitoring requirements, and provide no financial assurance requirements.

Ecology updated the solid waste regulations (WAC 173-304) in November 1985 to address evolving standards set by the federal Resource Conservation and Recovery Act. The updated regulations provide prescriptive closure standards, landfill gas and groundwater monitoring requirements, post-closure care requirements, and financial assurance requirements. The applicable solid waste regulations (WAC 173-350-400) were updated again in 2003, and incorporate some of the requirements established for municipal solid waste landfills (WAC 173-351). These regulations also reference the state cleanup regulation (WAC 173-340) that was enacted in 1989.

The landfill experienced some well publicized incidents related to fires, which persisted until 1986. I'll discuss these in the Frequently Asked Questions. The applicable closure requirements have been contested. By consolidating and capping the landfill material, P&GE is invoking current landfill regulations.



Development Plans

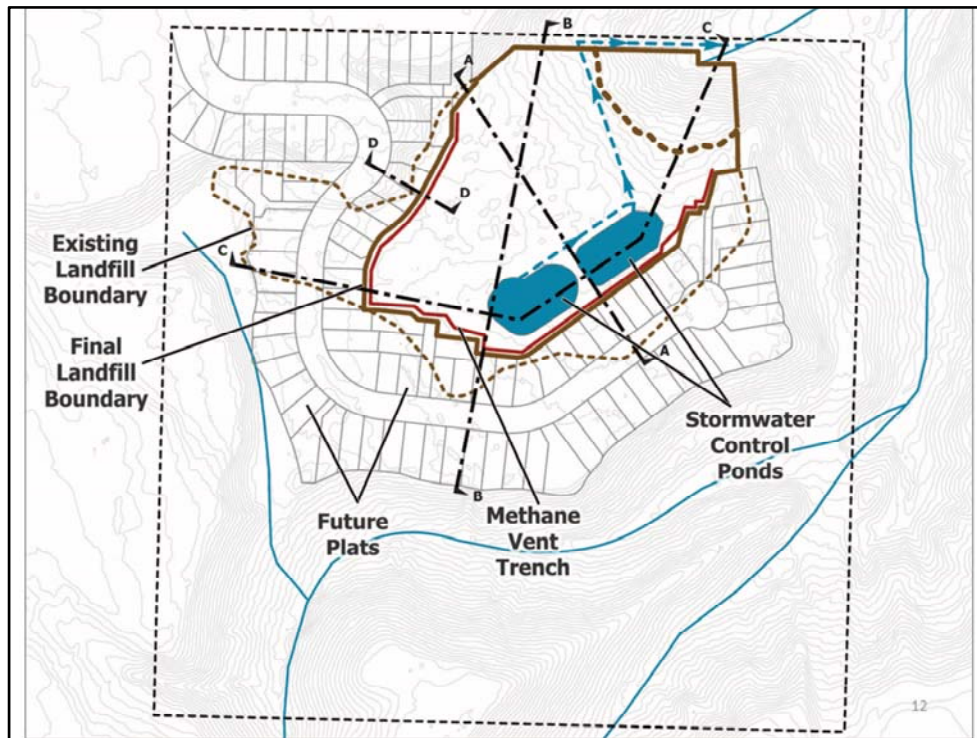


The peripheral area of the existing landfill will be excavated and placed in the center of the landfill, reducing the landfill footprint from 9.6 to 6.8 acres. The landfill will be covered with a 6-inch sand layer, an impermeable geomembrane, a drainage geocomposite, and a 2-foot soil layer composed of native sand and top soil.

Although landfill gas doesn't accumulate in the existing landfill, the impermeable landfill cover will block surface emissions. So the landfill closure plan includes the methane vent trench between the landfill and the future residential parcels. This shown by the red line. This trench will be constructed into the native soil and include a geomembrane to prevent gas migration. The gas in the trench is vented to the middle of the landfill and discharges above the breathing zone. The landfill closure plan includes 12 gas monitoring probes on the landfill parcel beyond the trench. The probes will be monitored to assess the effectiveness of the passive gas trench, and the trench can be upgraded with a blower to remove landfill gas if warranted.

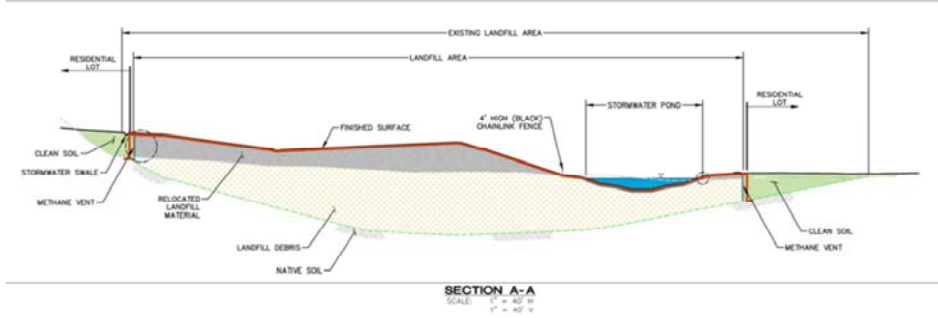
The existing landfill cover on the steep northeast slope will be retained. This slope includes trees and has remained stable the last four decades.

Two stormwater control ponds will be constructed on top of the landfill cover. These ponds will collect and store stormwater from the subdivision, and be used to reduce the peak stormwater flow. The stormwater is discharged through subsurface drains across the top of the landfill, then down the steep slope beyond the landfill, and discharge onto an energy dissipation mat and into the creek at the base of the landfill. The drainage system reduces erosion and enhances the stability of the northeast landfill slope. The stormwater ponds are set back about 200 feet from the steep slope, which significantly exceeds regulatory criteria for steep slopes.

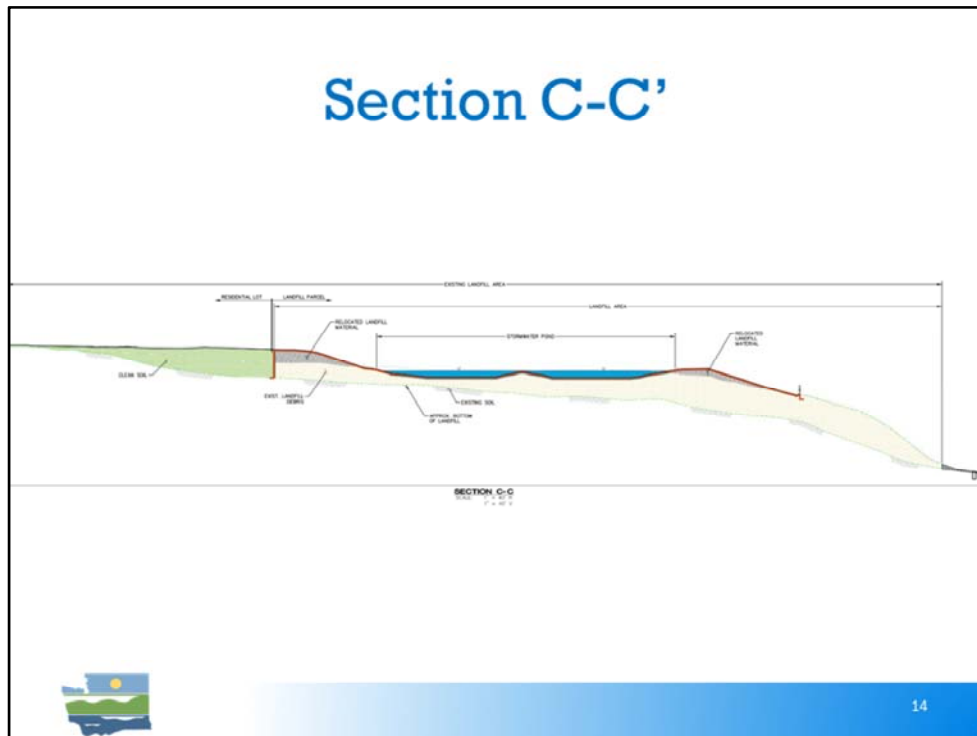


I want to show two profile sections that depict how the landfill will be modified by the grading activities. Section A-A' extends is a traverse section across the former ravine and Section C-C' extends in a longitudinal direction along the former ravine.

Section A-A'



The green shaded areas show where clean soil is brought in to re-contour the property after excavation of the wedge area. The gray shaded area shows where the excavated landfill material will be placed. The landfill material will be consolidated under landfill cover and the liner will extend around the methane vent trench and into the native soil. The green area will be used for residential development.



This section shows how the elevation will be increased on the west side of the property. Residential housing will be developed in this area. The section extends through the two stormwater control ponds and through the northeast slope. The stormwater ponds will be constructed into the existing landfill. The landfill material will be compacted beneath the ponds, and the landfill liner beneath the ponds will include a leak detection system. The new landfill cover will not extend down the northeast slope. This area was evaluated for its geotechnical stability, and the existing cover was considered stable. The toe of the slope will be buttressed with rock rip rap, to provide additional stability, and the stormwater ponds are setback more than the required setback distance.



Several permits are required for this project.

Solid Waste Facility Permit

- Snohomish Health District
- Limited Purpose Landfill (WAC 173-350)
- Requires Landfill Closure Plan (Jan 2018)
- Reissued permit to address:
 - Waste characterization, landfill cap drainage, landfill gas conveyance layer, conform with air & noise pollution regulations
 - Addressed in final design drawings and construction specifications



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Snohomish Health District (SHD) is the lead agency for issuing landfill permits, and Ecology provides technical assistance to the agency.

SHD issued a permit for the Limited Purpose Landfill on May 11, 2018, that requires P&GE to close the landfill in accordance with Landfill Closure Plan (January 2018). The permit was challenged in front of the Pollution Control Hearings Board, who affirmed the landfill closure plan as the conceptual closure plan. PCHB did request several changes, which are required in the reissued landfill permit on March 20, 2020, and adopted in the final design drawings and construction specifications. These changes include increased waste characterization sampling when contamination is detected, changes to the drainage layer and gas conveyance layer in the landfill cover, and conformance with county air and noise pollution regulations.

The design drawings and construction specifications were reviewed by Ecology, approved by the Snohomish Health District, and are provided on our website.

Land Disturbing Activity Permits

- Snohomish County Planning & Development Services
 - LDA#1 – initial grading, landfill closure
 - LDA#2 – plat development
- Mitigated Determination of Non-Significance



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Snohomish County Planning and Development Services (PDS) is the responsible agency for land use and development, and these issues are beyond the purview of the Department of Ecology. PDS is issuing two Land Disturbing Activity permits. The first permit is for site grading, which includes the landfill closure activities. PDS will issue a second permit for plat development, which includes construction of the road and infrastructure for the subdivision.

PDS was the lead agency for implementing the State Environmental Policy Act, and they issued a Mitigated Determination of Non-Significance in 2014. This was challenged in front of the Snohomish County Hearings Examiner, who remanded the decision for further evaluation of dust, noise, and traffic. The County hired independent consultants to evaluate dust, noise, and traffic. Their evaluation reports are provided in Appendix M of the Landfill Closure Plan, and their recommendations were adopted in the Landfill Closure Plan (Jan 2018). PDS reissued the MDNS on May 17, 2017, and this decision was affirmed by the Snohomish County Hearings Examiner on February 14, 2018.

Other Permits

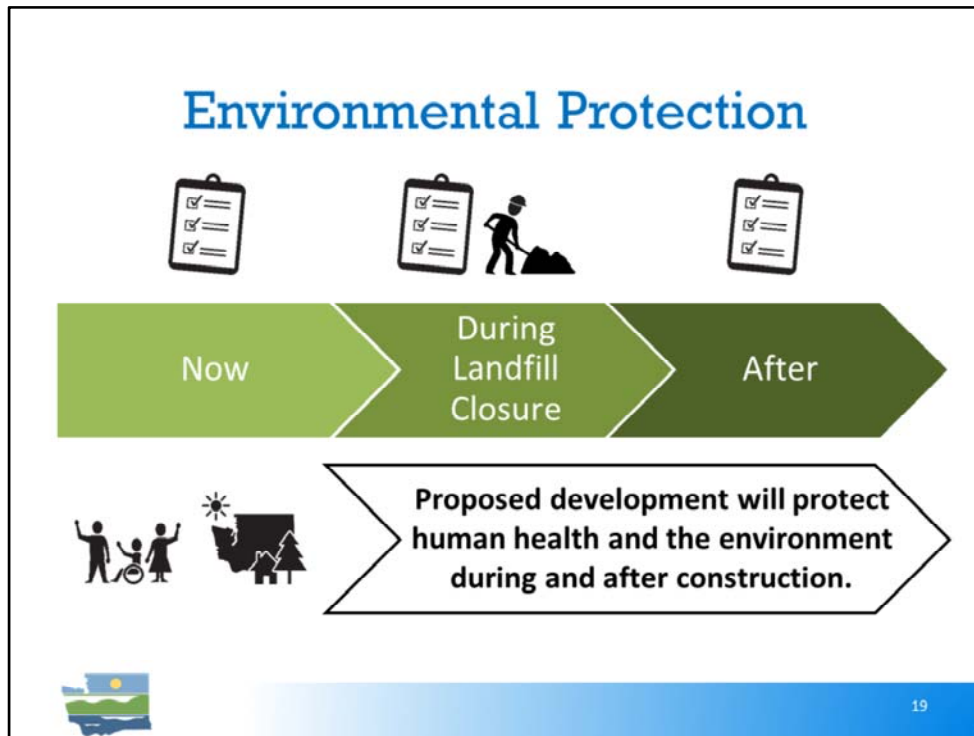
- Construction Stormwater General Permit
 - WA Department of Ecology
- Hydraulic Project Approval
 - WA Department of Fish & Wildlife



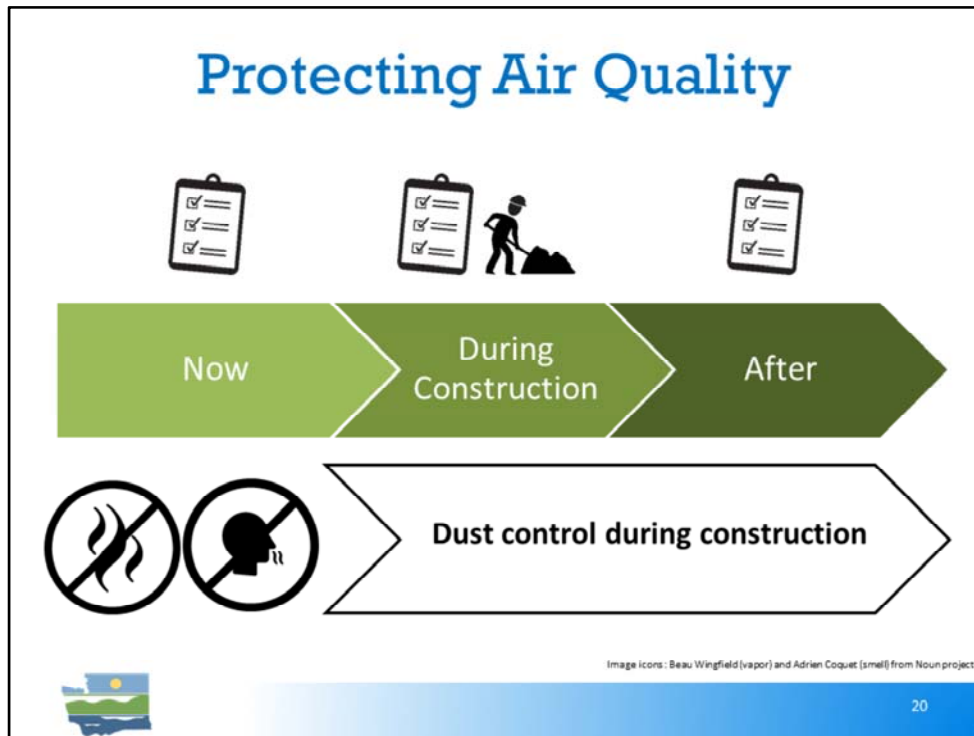
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Ecology's Water Quality Program has granted coverage under the Construction Stormwater General Permit. Any stormwater that contacts landfill material will be infiltrated through the landfill, as is currently done, and there will be no direct discharge of stormwater from the landfill working area until the impermeable cover is installed.

The Department of Fish and Wildlife issued a Hydraulic Project Approval permit that allows the stream to be relocated west of the future plats. The stream is beyond the existing landfill limit.



The landfill closure is protective of the environment. The final cover prevents exposure to landfill material. It controls surface water and prevents infiltration through landfill material. It improves groundwater and surface water quality and it includes landfill gas controls.



As part of State Environmental Policy Act (SEPA) process, Golder Associates provided an independent review of dust control in 2016, and recommended dust control Best Management Practices (BMPs). These recommendations were adopted in the January 2018 Landfill Closure Plan, and additional standards are provided in the final construction specifications in April 2020. Dust control BMPs are also included in the Stormwater Pollution Prevention Plan. I'll discuss some of the BMPs in the Frequently Asked Questions. The landfill permit requires conformance with county air quality regulations, and the project will confirm with Puget Sound Clean Air Agency regulations.



Cleanup Process

Role of Cleanup Process

- Applicable for landfill releases
- Ecology's role:
 - Implements Model Toxics Control Act
- Snohomish Health District's role:
 - May participate in negotiations, meetings, and correspondence
 - Must require remaining closure and post-closure activities
 - Must exercise permit authority



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The Model Toxics Control Act provides the state cleanup regulations. The cleanup regulations are applicable when hazardous substances are released beyond the landfill's containment system.

Whereas Ecology supports Snohomish Health District with implementing the solid waste regulations, Ecology becomes the lead agency in implementing the cleanup regulations.

During the cleanup process, Snohomish Health District must require the remaining closure and post-closure activities and must continue to exercise their permit authority.

Basis of Cleanup

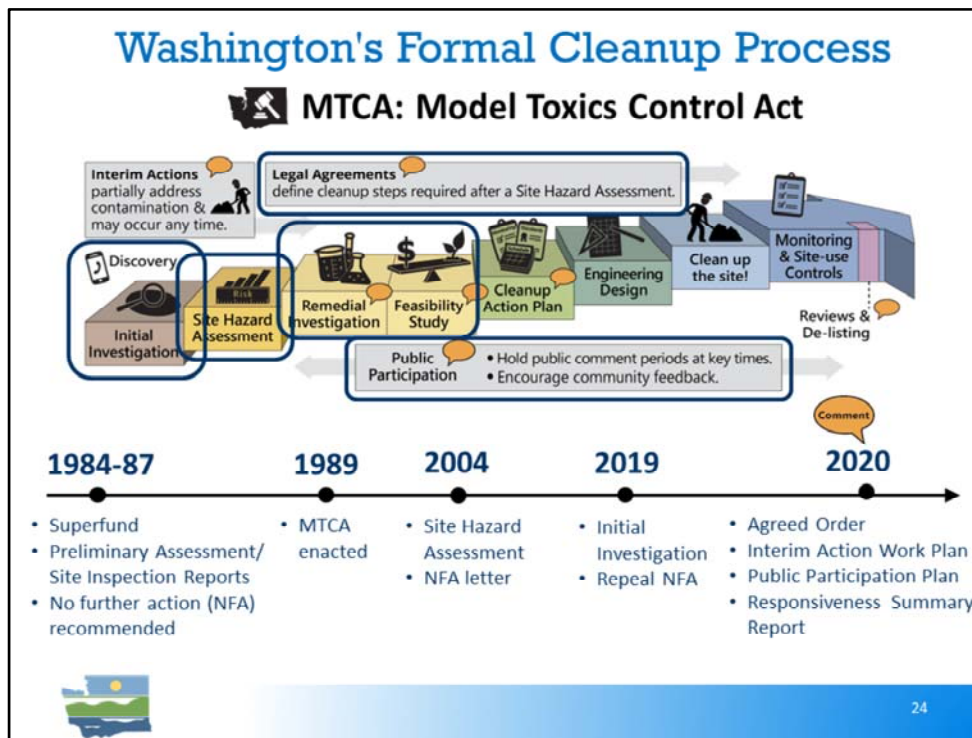
- Why now?
 - No previous monitoring requirements
 - Naturally occurring metals and background
 - Changing cleanup standards
 - Soil standards for residential development
- Groundwater impacts (2009)
 - Arsenic, iron, and manganese
- Surface water impacts (2002, -04, -09)
 - Manganese and iron



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So the question is why is the cleanup process starting now. Because this landfill operated under the initial solid waste regulations, there is limited groundwater and surface water monitoring data. There is evidence of elevated concentrations of naturally occurring metals in groundwater and surface water. Iron, manganese, and arsenic can be mobilized in anaerobic groundwater that results from the biological decay of wood waste. This is seen in almost all of the unlined landfills in western Washington. With these naturally occurring metals, there are always considerations of background concentrations and evolving cleanup standards.

The solid waste regulations do not include soil cleanup standards. The state cleanup regulations provide the regulatory framework for establishing soil cleanup standards and confirming that all landfill material and contaminated soil are removed from beyond the final landfill boundary.



The information graphic describes the steps in the cleanup process. The state regulations were enacted in 1989. Before 1989, the federal Superfund regulations were the applicable cleanup regulations. EPA performed a preliminary assessment in 1984 and a site inspection in 1987. EPA recommended No Further Action because the concentrations of metals in surface water were below drinking water standards. They did not evaluate groundwater because the shallow groundwater aquifer is not present downgradient from the landfill, and the underlying aquifer exists about 200 feet below the shallow aquifer, and is separated by consolidated, low permeable silty soil.

As development plans progressed, the Snohomish Health District prepared a Site Hazard Assessment in 2004, and recommended No Further Action (NFA) based on surface water and seepage samples collected in 2002 and 2004.

Ecology reevaluated the site last year, and reviewed groundwater sampling data from 2009 and previous surface water sampling data. Ecology rescinded the NFA because the concentrations of arsenic, iron, manganese, lead, and chromium exceeded groundwater cleanup levels.

This led to P&GE entering into a formal cleanup process with Ecology. Currently, we are requesting comments on an Agreed Order, Interim Action Work Plan, and Public Participation Plan. We will be providing a Responsiveness Summary Report to respond to the written comments that we receive.

Agreed Order

- Legal agreement
 - Interim action
 - Remedial investigation
 - Feasibility study
 - Cleanup action plan
- Public participation



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The Agreed Order is a legal agreement between P&GE and the Department of Ecology that requires P&GE to investigate and remediate any possible releases of hazardous substances outside the landfill under the Model Toxics Control Act. It requires P&GE to perform an interim action, perform a remedial investigation, prepare a feasibility study, and prepare a preliminary draft cleanup action plan.

The interim action will be performed concurrent with the permitted landfill closure plan, and is intended ensure the excavated portion of the landfill meets soil cleanup standards following landfill closure.

The Remedial Investigation (RI) will evaluate groundwater and surface water at the site, evaluate the cleanup standards, and define the boundary of the Site. The Feasibility Study (FS) will develop and evaluate alternatives for cleaning up the site. Since this is a landfill, the alternatives will include aspects common to landfill post-closure care, and will inform that post-closure care requirements for the landfill. Ecology will then prepare a Draft Cleanup Action Plan, which is a decision document that defines the cleanup standards and the recommended cleanup alternative.

Public participation is a key aspect of formal cleanups, so we will hold another public comment period to solicit comments on the Remedial Investigation/Feasibility Study report and the Draft Cleanup Action Plan.

Interim Action Work Plan

- Describes existing conditions
- Waste characterization
 - Previous testing
 - Supplemental testing
 - Field screening & contingent sampling
- Soil cleanup standards
 - Wedge area/interim action area
 - Lot exploration plan
 - Surface tank



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The Interim Action Work Plan (IAWP) is integrated into Agreed Order, and is developed to ensure that the wedge area is clean after waste is removed from the area and consolidated into the landfill.

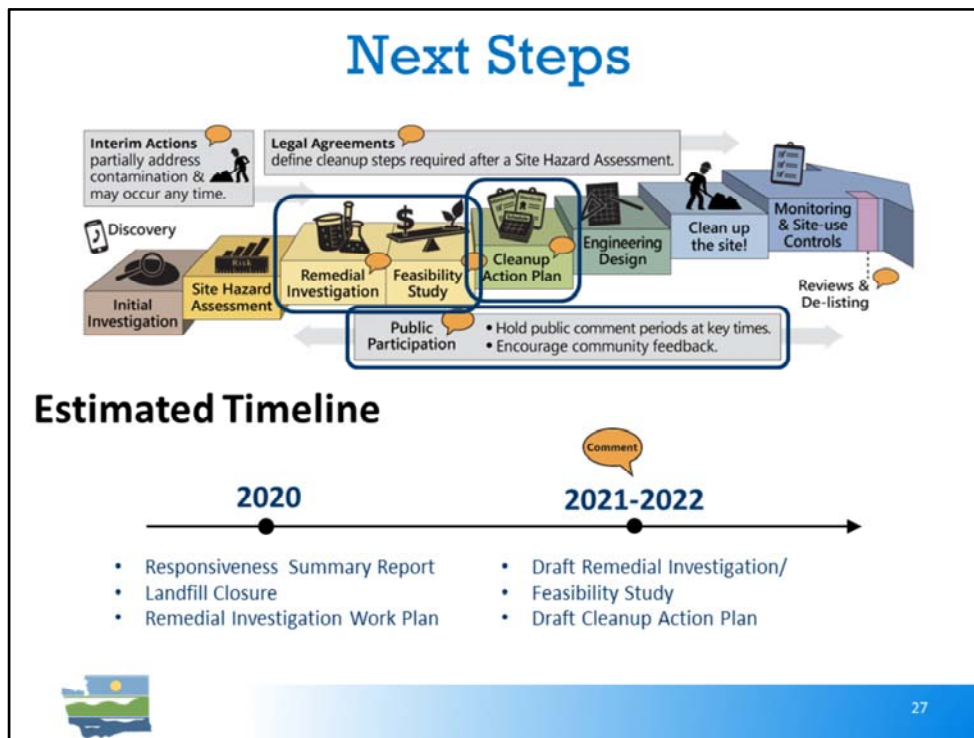
The work plan describes the geology and landfilling process, and summarizes previous investigations of the landfill material.

The Landfill Closure Plan identified the initial waste characterization parameters and frequency, but did not specify the supplemental sampling parameters. The Interim Action Work Plan identifies the supplemental waste characterization sampling locations and specifies a full-suite of analytical parameters. Since landfill material is heterogeneous by nature, it also identifies contingent sampling plans based on observations and field screening during excavation.

The primary objective of the Interim Action Work Plan is to establish soil cleanup standards and sampling plans to confirm that landfill material and contaminated soil are removed from the wedge area, and that it will be backfilled with clean soil.

The work plan describes the lot exploration plan in the construction specifications, which is the exploration plan to confirm that scattered waste has been removed from beyond the existing landfill limits, and it provides a contingent soil sampling plan.

The work plan also provides a soil sampling plan for a surface tank that was discarded on, and later removed from the property sometime after active landfill operations. We don't know specifics about the tank, but it was likely a discarded 500-gallon heating oil tank.



Ecology will prepare a Responsiveness Summary Report to respond to written comments submitted during the public comment period. Construction activities will be initiated while we respond to public comments. P&GE plans to initiate and complete the landfill closure plans in 2020. Concurrently, P&GE will prepare a Remedial Investigation Work Plan for Ecology’s review and acceptance. The remedial investigation may take a year or more because the periodic groundwater sampling requirements. Ecology will hold the next public comment period once the Draft Remedial Investigation/Feasibility Study Report and Draft Cleanup Action Plan are completed.

How to Comment



Comment Period: May 8 – June 28, 2020



Go online:

<http://swm.ecology.commentinput.com/?id=VfcB5>



Mail/email to:

Alan Noell – Site Manager

3190 160th Avenue S.E.
Bellevue, WA 98008
alan.noell@ecy.wa.gov



DEPARTMENT OF
ECOLOGY
State of Washington



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I'll quickly reiterate what Nancy covered earlier. We're currently 6 weeks into the public comment period, and have extended the comment period for 10 days after this meeting. Comments can be submitted with this link and mailed or emailed directly to me.

How to Stay Informed

<https://apps.ecology.wa.gov/gsp/Sitepage.aspx?csid=4294>

<https://apps.ecology.wa.gov/gsp/CleanupSiteDocuments.aspx?csid=4294>

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Ecology maintains websites for our cleanup sites. We use this to announce project updates and provide site summaries. Tim O'Connor will present this website later.

In the right hand banner, the site page provides a link to our document repository. This provides the various legal and administrative documents, such as the permits, agency letters, the Snohomish County Hearings Examiner and Pollution Control Hearings Board determinations, and the Agreed Order. We also provide previous cleanup reports, the landfill closure plan, the final design drawings and construction specifications, and the interim work plan, and we'll continue to post technical documents. Finally, we include public outreach documents, such as the Public Participation Plan and fact sheets. I plan to post this presentation to the website tomorrow.

DEPARTMENT OF ECOLOGY State of Washington
Go East Corp. Landfill Site / Bakerview Plat Subdivision
 4330 108th Street SE, Everett, WA 98208

Project Description
 P&GE, LLC (Property Owner) is redeveloping this 40.9 acre property to allow development of the Bakerview Subdivision.

Landfill Closure
 Sand excavation was performed from a ravine from 1969 to 1971, and the area was reclaimed with a permitted landfill from 1972 to 1983. Peripheral areas of the landfill will be excavated and consolidated, reducing the landfill area from 9.6 to 6.8 acres. The landfill will be closed under current landfill regulations as a Limited Purpose Landfill, and be subject to financial assurance and post-closure care requirements.

Cleanup Process
 P&GE, LLC entered into an Agreed Order with the Department of Ecology that requires them to implement an interim action work plan, prepare a remedial investigation/feasibility study report, and prepare a preliminary cleanup action plan. The interim action will ensure that portions of the property beyond the final landfill boundary are protective of human health and the environment. The remedial investigation/feasibility study and cleanup action plan will provide greater specificity to the landfill post-closure care requirements.

Bakerview Development
 P&GE, LLC will develop the 97-tract subdivision following landfill closure and completion of the interim action.

Construction Schedule
 Initial site grading, stream relocation, and landfill closure are scheduled to begin in July 2020 and be completed in the fall of 2020.



- Permits**
- Landfill Closure Permit, Snohomish Health District
 - Land Disturbing Activity Permit #1 (Initial Grading), Snohomish County Planning & Development Services
 - Land Disturbing Activity Permit #2 (Tract Development), Snohomish County Planning & Development Services
 - Construction Stormwater General Permit, Washington Department of Ecology
 - Hydraulic Project Approval Permit, Washington Department of Fish & Wildlife

 Alan Noel Site Manager, Environmental Engineer Department of Ecology 425-649-7015 alan.noel@ecy.wa.gov	 Marty Penhallegon PACE Engineers, President P&GE, LLC, Co-Owner 425-837-2014 marty@paceengrs.com	 Paul MacCready Senior Planner Planning & Development Services 425-262-2943 Paul.MacCready@co.snohomish.wa.us	 SNOHOMISH HEALTH DISTRICT www.shcd.org Snohomish Health District 425-339-5750
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Go East Corp Cleanup Website: <https://apps.ecology.wa.gov/gsp/Sitepage.aspx?csid=4294>

Either this week or next, P&GE will be installing an information board near the entrance of the property. This sign briefly describes the project and the separate landfill closure, cleanup, and development processes. My name and contact information are provided on the sign, and you're welcome to contact me after the public comment period concludes and the project progresses.

Marty Penhallegon's contact information is provided. Marty wears two hats, one as a co-owner of the property and the other as the president of PACE Engineers, who is leading the design and construction activities.

Many of you have met Paul MacCready with the County's Planning & Development Services. Paul is who you should contact with development questions.

Go East Corp Landfill Frequently Asked Questions

We will take a short break



We're going to take a quick break at this point, so I'll pass the mike to Megan.

We've been receiving a variety of comments so far, so I'd like respond to the some of the frequently asked questions. After this, we'll take another break, and then Tim will moderate a Q&A session.

Why excavate parts of landfill?

- Necessary for property development
 - Clean property for housing
 - Balanced grading plan



In short, the peripheral areas (or wedge area) of the landfill need to be excavated to make room for new development. It's also part of a balanced grading plan. The existing landfill is 50 to 90 feet below the adjacent parcels. The wedge area can be excavated and placed on the center of the landfill, raising it's elevation, and then covered with a minimum 2.5 foot landfill cover. Clean soil can moved from elevated portions of the property and used as fill in the wedge area to bring it up to grade.

What's in the landfill?

- Authorized for:
 - Originally “Wood, mineral, or concrete solid waste, but not garbage or putrescibles”
 - Amended for “tires and bulk packaging material such as cardboard, pallets, large parcel wrappings, shredded paper, and warehousing material”



The landfill basically contains wood waste and construction debris. The landfill was originally authorized for “wood, mineral, or concrete solid waste, but not garbage or putrescibles.” Putrescibles are basically high organic waste, such as food waste, that decays and produces strong odors. The permit was later amended for “tires and bulk packaging material such as cardboard, pallets, large parcel wrappings, shredded paper, and warehousing material.”

What about the fires?

- Baghouse dust (1974)
 - 200 cubic yards combustible dust
 - Rapid oxidation & heating
 - Creates stable metal oxides
- Landfill fires (1976-79, 83-86)
 - Methane generation, air intrusion
 - Wood waste
 - Breached landfill cells
 - Smoldering conditions



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In 1974, before the federal Resource Conservation and Recovery Act, the landfill received several truckloads of combustible metal dust. When metals are exposed to oxygen, they can rust, which is an exothermic reaction. Because metal dust has a very high surface area, the rusting process creates a lot of heat, which can combust when exposed to an ignition source, such as a spark. Based on the accounts I've read, this appears to have happened. The metal oxide end products, such as aluminum oxide, magnesium oxide, and phosphate, are generally stable and benign. The fire likely combusted materials and methane gas in the landfill, but it's speculative whether this led to later fires. The metallic waste was excavated, spread out, and extinguished.

The biological processes related to the decay of wood waste decrease the oxygen levels and generate methane gas. Methane is the same gas that's in the natural gas in your homes, but it exists in much lower concentrations in landfills. Methane is flammable between a concentration of 5 and 15 percent, and there's a potential for landfill fires when air is pulled into the landfill. For large municipal solid waste landfills, strict controls are placed on landfill gas extraction systems to reduce the fire potential. Generally, landfill fires are hard to detect and hard to extinguish. The combustion of methane and organic matter is fed by oxygen, so landfill fires are typically extinguished by starving them of oxygen.

In this case, the landfill fire and smoldering conditions persisted for a number of years, and there may have been one or more fires. When Go East Corporation purchased the landfill in 1979, they committed to extinguishing the fire, but requested the permit be reopened so they could level the property for development. Some of the fire fighter techniques may have actually enlarged the fire by breaching landfill cells, enlarging the combustion source, and introducing air to the fire.

The landfill fire has now been extinguished for 34 years. The methane generation rate has greatly decreased due to the age of the waste, and no new organic waste will be placed in the landfill.

What about testing?

- Waste characterization
 - Identify potentially dangerous waste
 - None encountered
- Test pits (June 2019)
 - Encountered asphaltic material, roof tar, creosote treated wood, charred material
 - Detected polycyclic aromatic hydrocarbons and heavy-oil range petroleum hydrocarbons
- Supplemental sampling (June 2020)
 - 12 new test pits, full-suite analysis
 - Additional screening during excavation



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When landfill material is excavated from the edge of the landfill and placed in the center of the landfill, no new waste is generated. The landfill closure plan requires that certain types of waste be removed and disposed offsite. This includes dangerous waste, PCB waste, asbestos containing material, and lead based paint. Dangerous waste is a technical term, and the state's definition of hazardous waste. Dangerous waste can be characterized as having very high concentrations of specific metal and organic compounds that leach above specific concentrations. PCB waste is also a technical term, with high concentration thresholds. With asbestos waste, there's some special handling requirements for friable asbestos, which is basis for its removal. The waste is characterized by both pre-excavation sampling and by observation, screening, and contingent sampling during excavation.

In June of 2019, P&GE sampled 25 test pits along the edge of the wedge area. Some the test pits encountered asphaltic material, roof tar, creosote treated wood, and charred material. Samples were collected and submitted for the analysis of metals, PAHs, and petroleum hydrocarbons. The concentrations of metals were far below the threshold for dangerous waste. Some PAHs and oil-range hydrocarbons were detected, but these are consistent with the asphalt, tar, creosote, and combustion residuals observed in the test pits.

P&GE will be sampling additional test pits from the wedge area, collecting samples from the most impacted interval, and submitting the samples for a full-suite of analytical parameters. Because landfill material is heterogeneous by nature, additional contingent sampling will be performed based on observation and field screening during excavation. The sampling results will be compared with waste characterization thresholds. The remaining waste will be contained below a landfill cover constructed in accordance with the stringent current landfill regulations.

What's being done for air quality?

- Best Management Practices (BMPs) for dust:
 - Daily briefings and observation
 - 15 mph speed limit & wind restrictions
 - Working area limited 1 acre
 - Non-worked areas covered
 - Fire hydrant installed for dust suppression



P&GE is following best management practices for dust control, as provided in the Stormwater Management Manual of Western Washington. The construction contractor will be holding daily briefs and observing dust impacts during work activities. They are imposing speed limits on the property and wind restrictions for earth moving activities. The working area will be limited to 1 acre and all non-worked areas will be covered. One of the first construction tasks will be to bring a water supply to the property to provide water for dust suppression activities.

What about the trees?

- Landfill 50-90 feet below property boundary
- Trees retained along property boundary with exceptions
- Grading plan requires excavating some areas to fill interim action area and construct landfill cover.
- Staging performed as allowable to retain perimeter trees



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I'll start by saying that the tree removal plans were addressed in the Land Disturbing Activity permit, and this is beyond the purview of Ecology. As mentioned earlier, the landfill is 50-90 feet below the surrounding houses. Most of the trees will be retained along the property boundary, but some of the trees need to be removed because soil is needed to backfill the wedge area and construct the landfill cover. Generally, trees will be retained near the entrance on the northwest corner of the property and along the west property boundary north of the wetlands. Trees will be removed from the hillside west of the stream because of the grading of this slope. East of the property entrance, the trees will be retained in the first few lots, but further east some trees need to be removed because the elevation will be lowered about 10 feet. If you live on one of the adjoining lots, I'd recommend you contact Marty Penhallegon with PACE Engineers with specific questions. Marty has indicated that he might be able to delay some tree removal along the perimeter until the soil is needed as backfill and landfill cover.

Will new homeowners be safe?

- Landfill material removed
 - Stringent interim action levels
 - Confirmation soil sampling and borrow source sampling plans
- Landfill gas ventilation and post-closure monitoring
- Future houses constructed with gas vapor barrier and ventilation system
- Remedial investigation for groundwater



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All landfill material and contaminated soil will be removed from the future residential parcels. Ecology developed stringent interim action levels for soil. The cleanup levels are protective of children eating dirt, flora and fauna, groundwater quality, and surface water, including contact recreation, drinking water, fish, and fish consumption. The Interim Action Work Plan provides a confirmation soil sampling plan to ensure that contaminated soil has been removed and a borrow source sampling plan to ensure that clean soil is backfilled onto the parcels.

The landfill closure design includes a methane vent trench between the landfill that extends into native soil, and an impermeable liner between the trench and neighborhood. Landfill gas will be monitored between the landfill and the neighborhood, and a blower can be installed if necessary to extract landfill gas.

The Landfill Closure Plan requires that the future houses be constructed with gas vapor barriers and ventilation systems. These are preventive measures, and are easy to include in new construction.

Groundwater will be evaluated during the Remedial Investigation. The new homes will be connected to the public water supply, so groundwater use is unlikely.

Will the landfill cover be safe?

- Prevents exposure
 - Landfill material sealed
- Controls stormwater
 - Reduces peak flow
 - Reduces erosion and protects landfill slope
- Controls infiltration
 - Drainage geocomposite
 - Impermeable geomembrane
- Controls emissions
 - Mature waste
 - Passively vented above breathing zone
- Fencing



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The landfill cover will be used as a common space in the subdivision that's open to the public. The landfill cover prevents exposure to the landfill material, and includes a minimum 2-ft cover on top of an impermeable geomembrane liner. The stormwater system reduces the peak flow, reduces erosion, and protects the landfill slope. The landfill cover contains an impermeable liner that prevents water from infiltrating through the landfill material, and the liner will be overlain by a drainage geocomposite to protect the soil cover. The methane generation rate is low because of the age of the wood waste, but the landfill cover includes a gas collection layer, a methane vent trench, and passive venting.

Although the landfill will be accessible, fencing will be installed around the stormwater ponds and at the top of the steep northeast slope.

What about landfill gas?

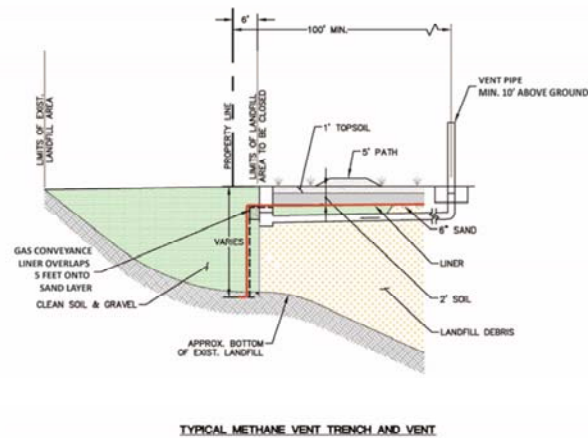
- Landfill gas
 - Generated by biological decay of wood waste
 - Mature waste (37 to 48 years), no new waste
 - Low levels
- Impermeable landfill cover
 - Blocks surface emissions
 - Diverted to methane vent trench and passive vents, upgradable system
 - Post-closure gas monitoring



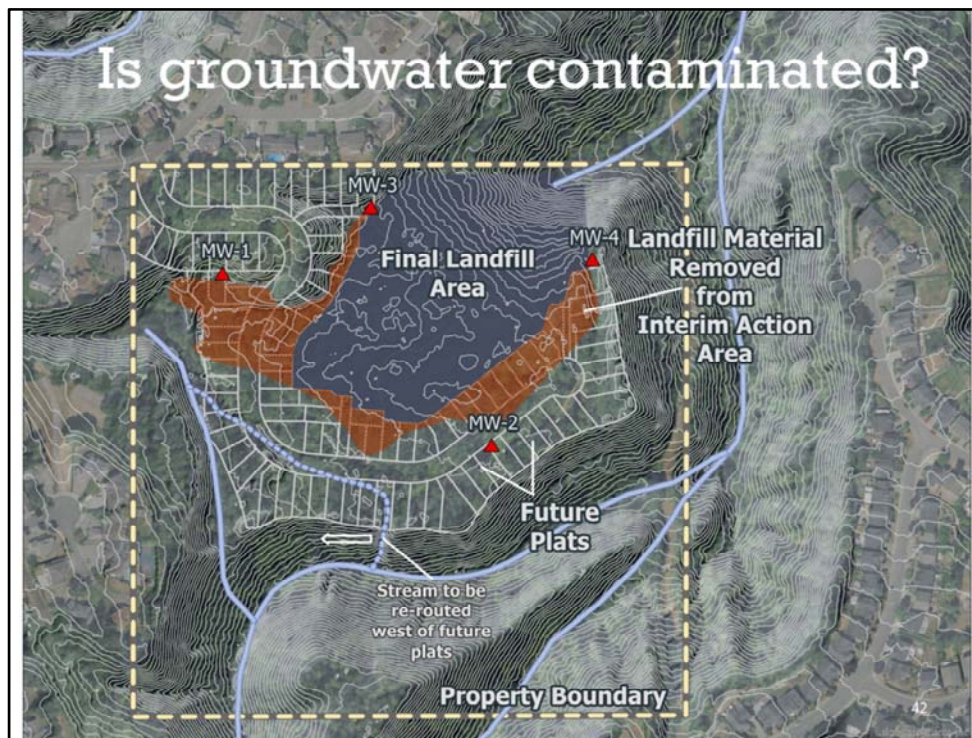
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Landfill gas is generated by the decay of organic waste in the landfill. Because of the age of the wood waste, most of the readily degrading waste has already decayed and the remaining wood waste has very slow degradation rates, generating low levels of methane. Methane currently doesn't accumulate because of the porous cover on the landfill. Once the impermeable cover is installed, surface emissions will be blocked and diverted through a sand layer to the methane vent trench and passive vents. 12 gas vents will be installed between the landfill and neighborhood, and sampled to confirm that gas does not migrate beyond the landfill. The landfill gas system is designed so that a blower can be installed to extract landfill gas if necessary. The landfill permit requires maintenance of the gas system and routine monitoring of landfill gas.

Methane Vent Trench Detail



I want to describe how the methane vent trench will be installed. The green shaded area shows where the existing landfill was excavated and backfilled with clean sand and gravel. The revised property boundary will be at least 6 feet from the landfill material. The trench will be installed beyond the landfill material, but within the impermeable liner. The impermeable liner will extend into the native soil beneath the landfill and a geocomposite liner will be installed inside the impermeable liner to provide connectivity between the gravel filled trench and the bottom of the liner. The trench is connected to vent pipe that allows the gases to escape and relieve any gas pressures. The vent pipes extend a minimum of 10-feet above the ground and above the breathing zone. This detail does not show the gas monitoring probes, but they will be installed on the landfill property outside the impermeable liner and be used to monitor soil gas in the native soil. If methane is found to be a problem, the trench is designed so that a blower can be installed to pull a vacuum on the trench and reduce any gas pressures that lead to landfill gas migration.



The landfill is constructed on the outcrop of the advanced outwash sand formation, and groundwater discharges from seeps in the ravines on the property. The sand formation is underlain by a 100 to 200 foot layer silty aquitard that separates the aquifer from the underlying aquifer.

Four wells were constructed and sampled in 2009. MW-1, MW-2, MW-3 were constructed on upgradient sides (west, south, and northwest) of the landfill and intercepted groundwater at the base of the advanced outwash sand formation. MW-4 was constructed on the east side of the landfill on the topographic divide, and did not encounter groundwater at the base of the advanced outwash formation. This is likely because groundwater drains into the ravines and there's limited recharge along the ridge line.

The wells were sampled for metals and semi-volatile organic compounds (SVOCs). No organic compounds were detected. Arsenic, iron, manganese, lead, and chromium were detected above groundwater cleanup levels. Naturally occurring iron, manganese, and arsenic are typically mobilized in anaerobic groundwater due to biodegradation reactions in unlined landfills.

The landfill construction plans include construction of two wells near the toe of the landfill and the construction of a seepage collection vault. These will allow groundwater to be sampled downgradient of the landfill.

By closing the landfill under the current regulations, the landfill will be subject to post-closure groundwater monitoring requirements.

The remedial investigation will include an evaluation of groundwater, and the cleanup action plan will provide greater specificity to the post-closure groundwater monitoring requirements.

Is surface water contaminated?

- EPA (1987) – No Further Action
 - Metal concentrations below drinking water standards
- 2002 seep samples
 - Analyzed for metals, VOCs, SVOCs, gasoline & diesel range petroleum hydrocarbons, PCBs, pesticides.
 - PAHs below current cleanup levels
 - Manganese and iron above current cleanup levels
- 2004 seep samples
 - Arsenic exceeded cleanup levels in background samples
- Remedial Investigation/Feasibility Study and Cleanup Action Plan



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The EPA recommended no further action in 1987 because the concentrations of metals were below drinking water standards.

In 2002, seepage samples were collected from the toe of the landfill and the ravine south of the landfill, and analyzed for a full-suite of chemicals. The only organic compounds detected were a couple polycyclic aromatic hydrocarbons (PAH) compounds, which were present below current surface water standards. This is consistent with the combustion residuals in the landfill. Manganese and iron were detected above the current cleanup levels. These metals are more soluble in anaerobic water, and are mobilized due to the biological reactions. When the groundwater is exposed to the atmosphere, these metals oxidize and fall out of solution. If you look at the toe of the landfill now, you'll see an interval of orange staining because the iron rusts and falls out of solution.

Snohomish Health District collected seepage samples along the south ravine in 2004 and detected arsenic above current cleanup levels. Because this seepage had limited interaction with landfill material, the samples are indicative of background concentrations.

The Remedial Investigation will evaluate the groundwater/surface water interactions, evaluate surface water cleanup standards, and identify the chemicals of concern. The Feasibility Study will develop and evaluate alternatives to clean up the surface water to applicable criteria, and the cleanup action plan will determine what cleanup action is required.

Why cleanup now, not earlier?

- Landfill regulations
 - No specific monitoring requirements under operating regulations
 - Post-closure monitoring requirements under current regulations
- Surface water and groundwater samples
- Why cleanup now?
 - Release of mobilized metals
 - Provides assurances for new development
 - Establish cleanup standards and cleanup plan
 - Provides greater specificity to post-closure care requirements



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The landfill operated under the initial state landfill regulations, and these regulations have no specific monitoring requirements. The implementation of the landfill closure plan requires post-closure care monitoring.

Surface water samples have been periodically collected since the 1980s, but these have not warranted a cleanup action. The groundwater aquifer does not exist downgradient of the landfill. Three groundwater samples were collected on the upgradient side of the landfill in 2009, but no organic contamination was detected and the metal concentrations are potentially representative of background conditions.

The elevated concentrations of metals in these upgradient monitoring wells were used to justify repealing the No Further Action determination. Now that the Site is in the cleanup program, we have a process for ensuring that the future plats will meet state cleanup standards and for providing better clarity of the groundwater/surface water system, identifying chemicals of concern and cleanup levels, and developing alternatives to meet these cleanup standards. Since this is a landfill, the cleanup plan may resemble and provide greater specificity for the post-closure care requirements.

Who will be responsible?

- P&GE
 - Maintains ownership of landfill
 - Maintains landfill permit
 - Responsible for post-closure care
 - Provides financial assurance



P&GE will maintain ownership of the landfill, maintain the landfill permit, be responsible for post-closure care, and provide financial assurance to ensure resources are available to meet these requirements.

What's post-closure care?

- Maintenance of landfill gas system and monitoring
- Groundwater and surface water monitoring
- Functional stability criteria



The current landfill regulations require post-closure care to ensure that the landfill containment systems remain effective for preventing the release of contamination. This may include the operation of landfill gas and leachate collection and treatment systems as long as they're necessary. For this landfill, the permit requires P&GE to maintain the landfill gas system and monitor landfill gas to ensure it meets the regulatory standards, and to monitor groundwater and surface water.

Post-closure care is required until functional stability criteria are met. Ecology has guidance establishing functional stability criteria for leachate, landfill gas, settlement and cover integrity, and groundwater quality.

What's the construction schedule?

Construction Activity	Start Date
Supplemental waste sampling	June 29, 2020
Erosion controls installation	July 6, 2020
Stream diversion	July 13, 2020
Clearing and grubbing	July 13, 2020
Landfill excavation	August 3, 2020
Landfill cap construction	August/September



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P&GE will collect the waste characterization samples this month. Ecology will probably receive these results in late July, and we plan to make them public before landfill excavation commences.

We're planning to provide a Responsiveness Summary Report to address comments received during the public comment period, and we'll share the waste characterization results in this report. I can't commit to a date on providing this report due to partial furloughs and other commitments, but I want you to know the comments are being considered in our actions. Delivery of the report is not tied to the construction schedule.

Currently, P&GE is planning to install the erosion and sediment controls after the holiday. This includes the silt fencing and other best management practices for stormwater protection.

The following week, stream diversion and clearing and grubbing activities are planned. The stream is beyond the landfill boundary and the clearing and grubbing activities include removing some trees.

Landfill excavation is currently scheduled to start in August. Landfill excavation and backfill will take a while because of the confirmation sampling requirements. The goal is to complete the earth moving activities before the raining season begins.

Question and Answer Session

We will take a short break



We'll take another break at this point, so I'll pass the presentation back to Megan.

Questions?



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