

Exhibit W

Generation of Solid Waste and Wastewater

**Mist Resiliency Project
August 2024**

Prepared for



NW Natural

Northwest Natural Gas

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Acronyms and Abbreviations

ESCP	Erosion and Sediment Control Plan
NMTP	North Mist Transmission Pipeline
NPDES	National Pollutant Discharge Elimination System
NWN	Northwest Natural Gas
OAR	Oregon Administrative Rule
ODEQ	Oregon Department of Environmental Quality
PGE	Portland General Electric Company
Project	Mist Resiliency Project

1.0 Introduction

Northwest Natural Gas (NWN), the Certificate Holder, proposes to amend the Site Certificate for its underground natural gas storage facility at the Mist Resiliency Project (Project) in Columbia County, Oregon. Exhibit W provides information on solid waste and wastewater minimization plans related to the construction and operation of the Project.

2.0 Description of Solid Waste and Wastewater Generation – OAR 345-021-0010(1)(w)(A)

OAR 345-021-0010(1)(w) Information about the applicant's plans to minimize the generation of solid waste and wastewater and to recycle or reuse solid waste and wastewater, providing evidence to support a finding by the Council as required by OAR 345-022-0120. The applicant must include:

OAR 345-021-0010(1)(w)(A) A description of the major types of solid waste and wastewater that construction, operation and retirement of the facility are likely to generate, including an estimate of the amount of solid waste and wastewater;

NWN has a hazardous and non-hazardous waste reduction and recycling program in place for all of its facilities (Attachment W-1) and implements a waste reduction and sustainability program for all of its activities and operations. Recycling/reuse is a priority for NWN and will be administered through each phase of the Project.

2.1 Solid Waste

2.1.1 Solid Waste Produced During Construction

Consistent with existing Site Certificate conditions, upon completion of construction, NWN will dispose of all temporary structures not required for future use, and all timber, brush, refuse, and flammable or combustible materials resulting from the clearing of land or from construction of the Project.

Solid wastes will be generated during the construction phase of the Project in the quantities outlined in Table W-1. These wastes will consist of non-hazardous construction materials including wood, packaging materials, scrap steel, welding rod, and erosion control materials such as silt fencing and bio-bags. The scrap steel and welding rod will be collected and transported to a recycling facility, consistent with existing Site Certificate conditions. The wood, packaging materials, silt fence material and bio-bags will be transported to a local landfill. Straw bales and stump grinding chips will be used as mulch where practicable. All waste will be accumulated within temporary construction areas prior to transport to the recycling facility or landfill, so there will be

no impact to surrounding or adjacent areas. Oily rags and any residual paints, solvents, and oils will be disposed of at a designated Hazardous Waste Facility. Table W-1 shows data for Miller Station and North Mist Compressor Station, laterals, and well pads. The calculations for Table W-1 can be found in Attachment M-1.

Table W-1. Construction Waste Quantities

Waste Classification	Waste Description	Estimated Total	UOM	Disposal Method
Solid	Human waste / refuse	61,000	GAL	Portable Toilet Service Disposal
	Post-consumer food waste	150	LBS	Landfill
	Building materials (wood, lumber)	100,000	LBS	Landfill
	Scrap metals (pipe, steel, hardware)	91,000	LBS	Metal Recycling
	Plastics (packaging / containers)	28,000	LBS	Recycling & Landfill
	Oily rags and/or absorbents	700	LBS	Hazardous Waste Facility
	Excavated soils/boulders	3,875	CY	Landfill
	Concrete (Washout)	58,800	LBS	Landfill
Liquids	Paints	7	GAL	Hazardous Waste Facility
	Solvents	7	GAL	Hazardous Waste Facility
	Lubricating Oils	14	GAL	Hazardous Waste Facility
	Water	750,000	GAL	Recycled & Drain on Site

After concrete is placed at a construction site, concrete washout is expected to be performed at or in the vicinity of the concrete placement. Concrete washout is defined as “water rinsing” of the chute of the concrete truck, the hopper of the concrete pump truck, and any tools or other equipment used to move or form concrete that must be washed out to prevent the residual concrete from hardening on and in the equipment. Washing of the inside of the concrete trucks is expected to be done at the individual batch plant sites, not at the placement site. The truck chute, pump truck hopper, and other tools may be rinsed on-site with the wastewater being collected in eco-buckets or similar approved collection devices.

Concrete washout will be performed only in designated areas in accordance with the Erosion and Sediment Control Plan (ESCP), which will be completed prior to construction as required by the National Pollutant Discharge Elimination System (NPDES) 1200-C Construction Stormwater Permit issued by the Oregon Department of Environmental Quality. The best management practices to manage concrete washout are identified in the ESCP presented in Exhibit I.

An example best management practice for conducting on-site washing includes using an eco-bucket, which is suspended from the bottom of the concrete truck chute to catch wastewater, which is then pumped or dumped back into the concrete drum when full, or into other approved sites that

are located away from surface waters. A concrete washout area can be a lined pit or bermed area large enough to contain the liquid and solid waste and prevent release of wastewater and/or sediments into streams and waterways. Alternatively, prefabricated concrete washout facilities may be provided; these facilities can be carried on a trailer or fitted with wheels to move from site to site as needed.

Washout areas will be inspected daily during active construction periods to prevent overrun and to ensure that they are situated in an environmentally prudent manner. Waste material (e.g., eco-buckets or similar) will be removed to an appropriate disposal site as soon as reasonably possible. Construction operators will be closely monitored to ensure proper management of concrete washout. With these safeguards in place, concrete washouts will be covered by the Project's NPDES 1200-C permit that NWN will obtain from Oregon Department of Environmental Quality prior to construction. All excess concrete will be sent back to the batch plant for recycling along with hardened concrete in designated washout areas.

2.1.2 Solid Waste Produced During Operation

There will be no continual generation of either hazardous or non-hazardous solid waste during the operation of the Project. Because there will be no continual generation of waste, no monitoring program is proposed.

2.1.3 Solid Waste Produced During Decommissioning

Consistent with existing Site Certificate conditions, prior to termination of the Site Certificate, NWN will retire the Project site sufficiently to restore it to a useful condition. All materials stored in buildings or located in process equipment will be removed, all buildings and steel structures will be disassembled, and all concrete slabs will be broken up and transported to a recycling facility or landfill. Any structural fill removed from the Project location (to restore soils for productive commercial forestry purposes) will be recycled and reused. If a monitoring plan is required for operation, retirement would fall under the existing plan. No hazardous substances will be generated during the retirement phase; therefore, no additional monitoring plan will be required.

2.2 Wastewater

2.2.1 Sanitary Wastewater

Sanitation during construction activities will be addressed through the provision of portable toilets located throughout the construction area at locations that will be determined by the construction contractor prior to and during construction. Portable toilets will be provided by a licensed subcontractor, who will be responsible for servicing the toilets at regular intervals and disposing of wastewater in accordance with local jurisdictional regulations. The construction contractor will ensure that a sufficient number of toilets are provided, and that the licensed subcontractor complies with applicable regulations, including the use of holding tanks for biological waste that

conform to OAR 340-071 and transportation of waste in accordance with Oregon Revised Statutes 466.005.

2.2.2 Wastewater Produced During Construction

During Project construction, waters from local sources will be used for hydrostatic testing of the pipelines and station piping, creation of horizontal directional drilling fluid, and dust abatement (see Exhibit O). The estimated volume of water required for dust abatement at NM2 is 195,000 gallons, plus an additional 195,000 gallons for dust abatement at Miller Station. Up to 63,000 gallons will be required for horizontal directional drilling fluid, and up to 185,000 gallons of water is estimated for hydrostatic testing of the completed pipeline lateral, well pad, and station piping at NM2. Lastly, up to 15,000 gallons of water will be needed for hydrostatic testing of the Miller Station piping.

The used water for the final hydrostatic testing (up to 185,000 gallons) will either be recycled or reused onsite

When necessary, wastewater generated during pipeline and compressor station construction will be stored in the new pipe and/or in baker tanks for reuse. Reuse will include, but will not be limited to, the mixing of drilling fluids and/or dust abatement via water truck. All wastewater will be accumulated within the temporary construction areas prior to reuse, resulting in no impact to surrounding or adjacent areas.

2.2.3 Wastewater Produced During Operation

There may be wastewater generation during the initial operation cycles of the storage wells. All waters will be disposed of in a manner consistent with requirements specified in approved permits. However, during the initial operation cycles of the storage wells, there may be up to 61,000 gallons of saline wastewater generated over a typical 150-day withdrawal cycle. Using water trucks, wastewater from the storage wells will be collected and disposed of in a local wastewater treatment plant.

The volumes of wastewater will diminish over time as the reservoir is cycled between injection and withdrawal to a net zero or de minimis amount. Once de minimis amounts are being produced, the produced waters will be dropped out of the gas stream by separators and collected in a tank located on the well pads and later transported to the produced water tank at North Mist Compressor Station. As needed, the produced water tanks will be emptied and its contents disposed of in a local wastewater treatment plant. In addition, any oily water produced during the general operation of the compressor station will be collected in the oily water tank located at North Mist Compressor Station. As needed, the oily water tank will be emptied and its contents disposed of in a local wastewater treatment plant.

2.2.4 Wastewater Produced During Decommissioning

There will be no generation of wastewater during the retirement of the Project.

3.0 Conclusion

NWN's solid waste and wastewater plans minimize generation of solid waste and wastewater in the construction, operation, and retirement phases of the Project. As described above, generation of solid wastes and wastewater will be minimal and short-term, and primarily limited to the construction phase. When solid waste or wastewater is generated, it will be recycled immediately, reused, or properly disposed of. No accumulation or storage of solid wastes or wastewater is proposed. For these reasons, there will be no significant adverse impacts to surrounding or adjacent areas, and no monitoring program will be necessary for solid waste or wastewater management. The existing conditions sufficiently address waste minimization concerns for this Request for Amendment.

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Attachment W-1. NW Natural Waste Minimization and Recycling Plan

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ATTACHMENT G-1:

NW NATURAL WASTE MINIMIZATION AND RECYCLING PLAN

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Waste Minimization & Recycling Plan

NW Natural is committed to excellence in environmental stewardship. In all activities, from office to field we work to encourage and accomplish waste minimization and recycling of materials. All employees have a role in reducing waste as we work to safely and effectively deliver natural gas to our customers throughout the region. In addition to practical application of this plan, NW Natural's senior management has been demonstrating leadership in stewardship for many years, even recognizing Environmental Stewardship as a core value.

Waste audits are conducted every 3-5 years in the Portland office to benchmark success of waste diversion and reduction processes. Additionally, programs and education are offered to all employees on the topic of waste reduction with regularity through intranet posts, special waste reduction challenges and sustainability lunch brownbag events.

Scope

This plan details practices for reduction and disposal of all waste streams (hazardous and non-hazardous) produced by NW Natural in all business operations and applies to all employees and contractors.

This plan covers both standard office operations and gas delivery as well as construction work managed by the Company. NW Natural works to reduce waste associated with processes whenever possible. Some limiting factors to further reduction include best practices in the areas of environmental management, health and safety. NW Natural will always prioritize operation in the manner that is most safe- this includes the use of one time use protective wear, site security and erosion prevention materials.

Waste Streams, Sources & Minimization/Disposal Strategy

NW Natural operates with best practices to produce the least waste possible without compromising quality and safety. Initiatives and policies support responsible purchasing, waste and resource use reduction. The company also works to responsibly dispose of or recycle those wastes which are produced necessarily. The annual waste footprint of NW Natural varies with the company's operational needs.

Non-hazardous Waste

The vast majority of NW Natural's waste streams fall under the category of Non-Hazardous. The types, sources and handling procedures of these waste streams are outlined in the table below.

Waste Type	Source(s)	Handling Procedure
Cardboard & Paper Products	<ul style="list-style-type: none"> • Office and print shop: generate paper waste and packaging waste. • Field Operations and Construction Packaging generate paper and cardboard waste. 	<ul style="list-style-type: none"> • The company has Policies in place to reduce paper use through behavioral guidelines and default printer settings on all office computers. • Clean Paper and Cardboard is recycled at all NW Natural offices. This includes traditional office generated waste as well as construction packaging. • All NW Natural offices participate in paper and cardboard collection and recycling programs in standard operations
Metals	<ul style="list-style-type: none"> • Construction and Maintenance: Steel pipe, and other metal equipment or construction debris. • Field Services: retired meter sets Depressurized spray paint vessels • Offices: Aluminum and Tin can collection 	<ul style="list-style-type: none"> • Pipe, meters and other scrap metals are collected, for recycling, at all office and construction sites in marked boxes and/or bins. Once full, NW Natural contacts hauler for collection. • Aluminum and tin cans are collected at all office sites in traditional municipal recycling. This stream is collected weekly by the contracted recycling hauler.
Plastics	<ul style="list-style-type: none"> • Polyethylene pipe • Equipment • Packaging • Plastic food and beverage containers 	<ul style="list-style-type: none"> • Scrap and retired polyethylene piping is collected at construction sites and service centers in marked containers. When containers are full vendor is contacted to coordinate recycling. • All plastic equipment and packaging that is recyclable in the local municipality is separated and recycle pickup is coordinated weekly



		<ul style="list-style-type: none"> • Plastic food and beverage containers are collected and recycled at all NW Natural offices as part of single or mixed stream recycling programs.
Wood	<ul style="list-style-type: none"> • Pallets- used in bulk and equipment delivery • Construction & Demolition Surplus 	<ul style="list-style-type: none"> • Pallets are collected and returned for reuse by vendor. • Wood not eligible for reuse will be transported to a facility for recycling.
Glass	<ul style="list-style-type: none"> • Facilities • Catering and break room - glass bottles and food containers 	<ul style="list-style-type: none"> • Collect florescent light bulbs in centralized collection containers for recycling- (hazardous mercury collected-see next table). • Recycle glass bottles locally through municipal waste collection programs-regular hauler pick-up at all offices.
Liquids (non-hazardous)	<ul style="list-style-type: none"> • Automotive and equipment Paint (latex & oil based paints) • Automotive Oil • Pipeline Oil • Anti-Freeze 	<ul style="list-style-type: none"> • Best practice is to use chemical products completely so no waste is generated. • Used paint thinner is collected and distilled for reuse. • Remaining chemical waste is classified and disposed of using certified vendor and landfill/ incinerator facility. • Used oil is collected and recycled using certified vendor • Used anti-freeze is recycled by vendor
Electronics	<ul style="list-style-type: none"> • Office & Field Equipment use of small and large electronic equipment for regular operations (computers, handheld data devices, GPS, printers, cellular phones, etc.) 	<ul style="list-style-type: none"> • NW Natural collects and returns to vendor or certified recycler.
Organic Food & Plant associated	<ul style="list-style-type: none"> • Office Kitchen & Break-room wastes and Catering Wastes. • Greenspace clearing debris-limited. 	<ul style="list-style-type: none"> • NW Natural participates in composting programs available in metro Portland. • Organic waste generated in areas without municipal compost are disposed of in the traditional solid waste stream.

Hazardous Waste

NW Natural’s Environmental Management, Safety and Purchasing department have prioritized the purchase of nonhazardous and water based solvents and solutions whenever possible for more than 20 years.

The Chemical Safety Evaluation Committee (CSEC), chaired by Environmental Management staff and including members from both the Safety and Purchasing departments, determines if a proposed new



chemical is acceptable and beneficial for use in NW Natural operations. Chemicals are assessed based on the potential ecological toxicity, worker health and safety criteria, safety of storage and end of life disposal considerations.

The CSEC meets as needed to evaluate requests for new chemical use. It employs an online program for managing Safety Data Sheets. Additionally, CSEC conducts periodic audits and inventories chemicals used in company facilities, in conjunction with a third party firm, to ensure the catalog of active chemicals in use at NWN is accurate and up to date.

Market availability is the limiting factor in almost all of our remaining hazardous waste streams. As new products become available, it may be possible to move toward the eventual goal of zero.

Waste Type	Source(s)	Handling Procedure
Chemical	<ul style="list-style-type: none"> Automotive Cleaning Mercury containing items 	<ul style="list-style-type: none"> Best practice is to use chemical products completely so no waste is generated. Used paint thinner is collected and distilled for reuse. Remaining chemical waste is classified and disposed of using certified vendor and landfill/ incinerator facility.
Battery	<ul style="list-style-type: none"> Facilities Operations 	<ul style="list-style-type: none"> Batteries are collected at each facility and then recycled through a certified vendor.
Fluorescent Lamps	<ul style="list-style-type: none"> Facilities 	<ul style="list-style-type: none"> Collect spent lamps and crush bulbs for glass recycling; Residual mercury is captured and disposed of as listed hazardous waste.
Liquids (Hazardous)	<ul style="list-style-type: none"> Aerosol marking paint 	<ul style="list-style-type: none"> Collect residual waste paint from aerosol marking paint cans. Waste paint is disposed of using certified vendor incinerator facility
Solid Waste (Hazardous)	<ul style="list-style-type: none"> Liquefied Natural Gas (LNG) Plant(s) Pipeline Contaminants 	<ul style="list-style-type: none"> Gas filters (Molecular Sieve Media) utilized at LNG Plants is replaced on an as-needed basis resulting in hazardous waste generation. Sieve media is disposed of at a certified waste disposal facility. Pipeline Oil sludge and carbon black generated from pipeline maintenance is analyzed. If determined hazardous it is disposed of using a certified waste disposal facility.

Other Impact Reductions

Water Management Plan

Responsible water use is a priority in all construction and operational use.

Construction

NWN actively coordinates construction water use and sourcing with local water districts to ensure water is utilized with the least impact to both the environment and customers. This is especially key in dry and drought seasons.

When water is used on construction sites, NWN works to optimize water collection, reuse and recycling throughout the project whenever possible.

Automotive & Equipment Maintenance

All NW Natural auto garages comply with DEQ's EcoBiz Certification program. The EcoBiz program is composed of environmentally sustainable practices that are codified into legal requirements, best practices, and elective actions that support a sustainable workplace. Some of the compliance measures outlined in the EcoBiz program include waste minimization, waste collection, waste recycling, chemical storage, chemical reduction practices, sustainable purchasing protocols, waste water collection, and employee training.

Special Programs & Certifications

Eco-Biz Certification



All NW Natural Automotive Service Centers have attained Eco-Biz certification. The EcoBiz Maintenance Certification Program recognizes mechanical shops that reach the highest standards in minimizing their environmental impact. The goal of the program is to prevent and minimize pollution.

EPA Gas Star Program



NW Natural participates in the EPA Gas Star Program. This voluntary program applies to all sectors of the natural gas industry and provides industry best practices which NW Natural follows.

Sustainability at Work Gold Certification



NW Natural has been recognized by the **City of Portland's Bureau of Planning and Sustainability** as a Sustainable Workplace at the gold level. This certification is awarded to companies that achieve excellence in waste reduction, environmentally responsible practices, and employee programs.

Waste Minimization Responsibilities

Leadership

NW Natural officers are committed to Environmental Stewardship. The all-employee corporate expectations document is distributed to all staff (see attachment).

Environmental Management

In all areas of environmental compliance and voluntary management actions the Environmental Management department monitors and manages behaviors in construction, waste disposal, water use, erosion control, right of way maintenance, and other situational environmental issues.

All Employees: Best Practices

All NW Natural Employees are expected to operate with the core value of Environmental Stewardship in all work they do from office to field.

Green Team & Challenges

A volunteer group of employees, NW Natural's green team, implement voluntary programs including initiatives around waste stream management and resource utilization. All employees have the opportunity to participate in challenges to reduce their footprints.

NW Natural Environmental Stewardship

NW Natural's Sustainability Guidelines

NW Natural has been a regional leader on environmental policy for many years – from promoting energy efficiency to creation of the Smart Energy Program to advocacy on behalf of livability in the Pacific Northwest. As we help our customers use less energy and reduce their carbon footprint, we are setting sustainability expectations for ourselves, as well.

In the daily operation of our company, we have substantially cut back our use of toxic materials, and we are a regional utility leader in reducing our fleet's carbon emissions. Every facility remodel helps us better manage our energy use; every pipeline improvement reduces the potential for methane emissions, as well as safety hazards; and every construction project applies the best environmental practices we know of.

As with every aspect of our business, we comply with all laws and regulations governing environmental protection. But we don't stop at compliance – we constantly look for ways to do more than meet the requirements.

The ongoing challenge is to continuously find better methods to reduce the impact of our operations on the environment.

Environmental Stewardship is one of the company's core values. While company-wide policies, procedures and investments support this value, the steps you take each day at work can also make a great contribution to environmental protection.

The Green Team suggests these actions you can incorporate into your daily activities.

REDUCE, REUSE, RECYCLE at NW Natural.

Actions to reduce resource use, reuse materials and dispose of waste responsibly benefit more than the environment. Most sustainable practices are accompanied by cost savings and community benefits, so they are good for business from many perspectives. That's why it's valuable to apply these guidelines in all aspects of our work.



REDUCE. Of the “three R’s,” Reduce is the most important:

Be paper smart: Before you print, think about it. A digital file may be all you need. If you need a hard copy, use double-sided printing whenever possible, according to company policy. Many printers are set to use two sides of the paper automatically – set your computer to print on those printers. Also, make two-sided copies whenever possible. For more ways to reduce your paper use, check out NW Natural's [Paper and Printing Policies](#). Find it on the Hub at **OurNWN>Culture & Community>Sustainability** and click on **Waste Reduction**.

Drive Mindfully: You have the opportunity to make environmentally responsible choices whenever you're in a vehicle. Every gallon of gasoline burned creates 20 pounds of carbon emissions. One easy way to use less fuel is to reduce the amount of time you spend idling in your car, truck or van. Learn more about the 2014 launch of the [idling reduction initiative](#) for our vehicle fleet. Find it on the Hub by visiting **OurNWN>Culture & Community>Sustainability**, then, click on **Field Operations**.

REUSE

Office Supply Collection & Reuse: Surplus and used office supplies can have a second life beyond your desk. Starting this summer, NW Natural's Green Team will set up collection stations for reusable office supplies. From staplers and scissors to file folders and binders, reuse can add up to savings.

Drink and eat responsibly: Avoid single-use beverage and food containers. Instead, grab a glass or mug from your break room. This summer, the **Reduce, Reuse, Recaffeinate** initiative will focus on reducing the paper cup waste that happens in our coffee-crazed part of the world.

RECYCLE

Recycle and dispose of waste with care. We're fortunate to be in a region that values recycling and smart waste management. Recycling services are available everywhere NW Natural has operations. The City of Portland has the most extensive options for waste disposal in our service area, including compost collection. Use the resources available in your office and try to keep waste out of landfills. The company is rolling out [clearer signage](#) in 2014 to make the process even easier. Read more about this on the Hub at **OurNWN>Culture & Community>Sustainability** and click on **Waste Reduction**.

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