



Environmental and Social Impact Assessment and Environmental Management Plan (ESIA/ESMP) Addendum

Plugging and Abandonment of
Exploration Well N-4

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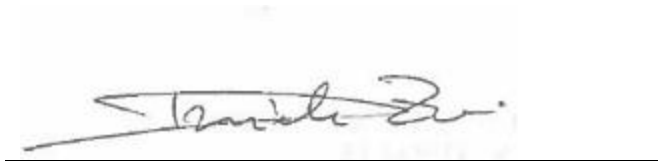
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ACRONYMS AND ABBREVIATIONS

Acronym	Description
CDB	Caribbean Development Bank
EPC	Engineering Procurement and P&A activities
ESIA	Environmental and Social Impact Assessment
ESMP	Environmental and Social Management Plan
ESRP	CDB's Environmental and Social Policy Framework
IDB	Inter-American Development Bank
IFC	International Finance Cooperation
KPI	Key Performance Indicators
NEVLEC	Nevis Electricity Company Limited
NHLDC	Nevis Housing and Land Development Corporation

Acronym	Description
PPE	Personal Protective Equipment
P&A	Plugging and Abandonment
SPCC	Spill Prevention Control and Countermeasures
SKN	St. Kitts and Nevis
SEF	Sustainable Energy Facility
WHO	World Health Organization

1. EXECUTIVE SUMMARY

This Environmental and Social Impact Assessment and Environmental and Social Management Plan (ESIA/ESMP) addendum have been prepared to evaluate the potential impacts associated with the Plugging and Abandonment (P&A) of the exploration well N-4 located in Hamilton State, Nevis Island. This activity is part of a larger geothermal Project sponsored by Nevis Electricity Company Limited (NEVLEC), a state-owned company, subsidiary of the Nevis Island Administration and the sole provider of electricity on the island of Nevis. The geothermal Project is discussed in an ESIA/ESMP, completed in October 2022, which includes among other things, the drilling of three production wells and two injection wells. The impacts of the drilling of the wells as well as the proposed mitigation measures are not discussed in this addendum. This addendum outlines mitigation and management measures in ensuring compliance with local and international environmental standards, while safeguarding public health and safety. The existing ESIA/ESMP (2022) capture a comprehensive view of the overall Project, and this addendum is complementary. Both documents aim to analyze risks and propose mitigation measures which align with local standards and the requirements of the Inter-American Development Bank (IDB) and Caribbean Development Bank (CDB) for projects of this nature.

Key resources potentially affected include air quality, water quality, noise and vibration, and traffic. Based on the magnitude and significance of potential impacts on the receptors, a suite of mitigation measures and management plans were developed to minimize potential impacts likely to arise during the P&A (see Tables 5.3, 5.4, 5.5, and 5.6 for details). Roles and responsibilities have also been identified for Nevlec to ensure that the mitigation measures proposed are monitored and implemented during the P&A process (see Table 6.1).

The impacts from the P&A activities will only minimally add to those caused by the drilling of the five additional wells. The main impacts from the P&A activities that had a moderate significance before the application of mitigation measures are the following:

- Water quantity, required for P&A activities
- Water quality due to possible spills (e.g. oil from machinery) within the construction area
- Air quality due to the use of construction equipment
- Noise from the use of construction equipment
- Traffic, from the increase in the number of vehicles (construction trucks, drill rigs) in the area
- Waste generation during P&A activities

The main mitigation measures are as follows:

- For water quantity: Monitor water flow rate and usage to detect leaks and keep water usage within the estimated quantities; engage and coordinate with the water department to make sure NEVLEC's consumption is within the stipulated limits and not impede water for the Island
- For water quality: Fuels, lubricants, and other hazardous materials used in P&A activities equipment will be stored in appropriate storage tanks and that will be in beamed zones within laydown areas and have secondary containment for hazardous materials; minimize/eliminate having water accumulation to prevent vector-borne diseases.

- For air quality: Wetting techniques will be employed to minimize dispersion of particles; use of blower fans to be used in the well cellar if hydrogen sulfide is detected; workers will carry portable H₂S detectors; only authorized workers will be allowed in the cellar, where H₂S could potentially accumulate.
- For noise: Vehicles and machinery will be equipped with silencers and will be serviced to manufactures requirement to prevent excessive generation of noise; and prior notice will be given to stakeholders via Nevlec's website, radio and newspapers, regarding Project activities and schedule.
- For traffic: The activities should be scheduled, to the extent possible, skipping peak hours to minimize the impact of barrier to the movement of people and traffic; diversions, danger points and works at culverts, bridges and P&A activities sites will have appropriate warning signs; this is particularly important at night to avoid accidents; worker's sensitization and training on driving; trucks will not sit or stop on culvers or stormwater bridges.
- For waste management: The Waste Management Plan must be implemented to ensure that all liquid and solid hazardous and non-hazardous waste is treated and/or disposed of in accordance with national regulations and international guidelines.

After applying all the mitigation measures described in detail in Section 6.2, all the impacts are then reduced to minor or negligible significance.

The P&A activities for well N-4 in Nevis are anticipated to have minimal and manageable environmental and social impacts which are localized and short term, provided that the recommended mitigation measures are effectively implemented. An Appendix was also prepared to assess the potential impacts associated with the P&A of another exploration well, N-3, approximately 6 meters away from N-4, and which utilizes the same well pad, but is not, at this time, slated for decommissioning.

2. INTRODUCTION

Nevis Electricity Company Limited (NEVLEC) is planning to plug and abandon (P&A) a geothermal test well named N-4 due to its existing well integrity. N-4 is one of several exploratory wells that were drilled between 2008 and 2017, and later tested in 2018, in Nevis Island as part of a larger geothermal Project at Hamilton Estate. Such Project seeks funding from the Inter-American Development Bank (IDB) through the Sustainable Energy Facility (SEF) program, which is executed by the Caribbean Development Bank (CDB). As such, an IDB and CDB-aligned Environmental and Social Impact Assessment and Environmental and Social Management Plan (ESIA/ESMP) was prepared in 2020 and later updated in 2022¹; the ESIA's included the future drilling of five additional wells (three production and two injection wells). This document is an addendum to the 2022 ESIA/ESMP and aims at incorporating the assessment of risks and impacts of P&A activities specifically for N-4 which is now included in the scope.

Additionally, while not part of the expanded Project scope, NEVLEC may later opt to change the well-head of slim hole well N-3 (also a test well located within Hamilton Estate), and potentially, P&A. The risks and impacts from P&A of N-3 are provided in a separate, stand-alone document, which is found in Appendix B.

For this assessment, Environmental Resources Management (ERM) reviewed Project information and conducted a site visit from August 7 to 8, 2024. During the site visit, ERM conducted interviews with NEVLEC and the Nevis Housing and Land Development Corporation (NHLDC). The following sections detail the Project description, impacts and management measures for P&A activities of N-4. This addendum should be read in conjunction with the 2022 ESIA/ESMP to understand NEVLEC's geothermal development project.

2.1 OBJECTIVES

The general objective of this ESIA/ESMP addendum is to include the P&A activities of N-4 in the existing Project ESIA/ESMP to account for potential risks and impacts of such activity.

The specific objectives and scope are:

- To update the Project Description to include plug and abandonment activities of well N-4.
- To enhance the Projects' alignment with the policy, legal, and administrative frameworks to incorporate International Finance Corporation (IFC), IDB's, CDB's and Green Climate Fund (CGF) requirements as applicable.
- To update the impact and risk analysis and measures to minimize negative impacts and enhance positive impacts of the Project, following the mitigation hierarchy.

¹ Available at: https://www.caribank.org/publication_types/documents/environmental-and-social-impact-assessments/nevis-geothermal-wells-drilling-project.

3. LEGAL AND ADMINISTRATIVE FRAMEWORK

All applicable policy requirements as well as the legal and administrative framework of St. Kitts and Nevis are listed in the 2022 ESIA. This document in its entirety can be found at <https://www.nevlec.com/wp-content/uploads/2024/07/Supplemental-ESIA-Nevis-Drilling-Campaign-102522red-1.pdf>

For easy reference, ERM has listed the applicable framework below. Please refer to the 2022 ESIA for a full description of the applicable framework:

- St. Kitts and Nevis national legislation.
- Inter-American Development Bank (IDB) safeguards and policies.
- Caribbean Development Bank (CDB) policies and strategies.
- The International Finance Corporation (IFC) Performance Standards (2012) and World Bank Group (WBG) EHS Guidelines (2007), as well as the EHS Guidelines for Geothermal Power Generation (2007).
- International Conventions and Agreements of which St. Kitts and Nevis is signatory.

4. PROJECT DESCRIPTION

4.1 OVERVIEW

Exploration and test well N-4 is a vertical core hole, and the fourth geothermal exploration core hole drilled in Nevis Island between 2017 and 2018. Well N-4 was spudded on November 22, 2017, and was drilled to a total 3,134 feet measured depth. Well N-4 is located within a cellar 2 meters long by 2 meters wide, and a depth of 2.5 meters at Hamilton Estate, which is government-owned land (designated as 'crown land' by NEVLEC). Hamilton state is close to the area where a future geothermal power plant will be constructed. Well N-4 is positioned within 30 feet of well N-3 on a shared well pad, which is discussed separately in Appendix B.

The estimated duration for the P&A at well N-4 is 8 to 10 days, which is anticipated to occur in May 2025.

4.2 LOCATION AND SETTING

The geothermal Project will be located at the Hamilton Estate property on the southwestern side of Nevis Island. The Project began by clearing and grading secondary vegetation in the to be developed well pads and laydown areas, leaving a secondary vegetated buffer around the production well pad and north of the site. Adjacent to the Hamilton Estate are farms and private land, but the developmental environment is largely rural, and the population-density is low. The Project location and ancillary infrastructure are depicted in Figure 4.1 and Figure 4.2 to provide context, ERM has included future production and injection wells that are part of the overall Project in Figure 4.1. However, note that wells N5, N6, N7, I-1 and I-2 are discussed in the 2022 ESIA/ESMP.

4.3 N-4 STATUS

According to the document titled "Draft Repair Plan of Well N-4" dated October 2022 (provided in Appendix C), the "Draft Hazard and Risk Assessment Report" (Appendix D), and the "N-3 N-4 Site Observation Report" (Appendix E), all prepared by NEVLEC's drilling consultant (JD Consulting), the following should be noted:

- Well components have deteriorated in a manner that renders the well potentially unsafe or not economically repairable.
- The well has no purpose of use in the long term permanently.
- Where the annulus outside the innermost cemented string of casing is suspected of being inadequately sealed and might allow flow to the surface, then every reasonable attempt shall be made to seal the annulus by squeeze cementing. If the annulus cannot be squeeze-cemented from the surface, then perforation and squeeze-cementing or removal of the upper joints of casing prior to filling the well with cement may be considered.
- Removal of cellar and casing to a depth below ground level that is unlikely to affect future ground use.

Well N-4 and its cellar are surrounded by a fence that restricts access. The well area is positioned next to an equipment container (see photo log in Appendix A) and a few meters from N-3, another exploratory well. The ERM site visit confirmed what was previously reported by JD Consulting, which is that well N-4 is severely corroded on the wellhead and observed an open space between the production casing and the annulus, caused from inadequately cementing the well during exploratory drilling. This means that any substance could potentially percolate into that open space, which could lead to negative impacts to the immediate environment and potentially threaten water quality if a hazardous substance was introduced. Appendix D includes technical details on the condition of well N-4 as well as the reasons to recommend P&A.

FIGURE 4.1 PROJECT LOCATION



FIGURE 4.2 ANCILLARY INFRASTRUCTURE

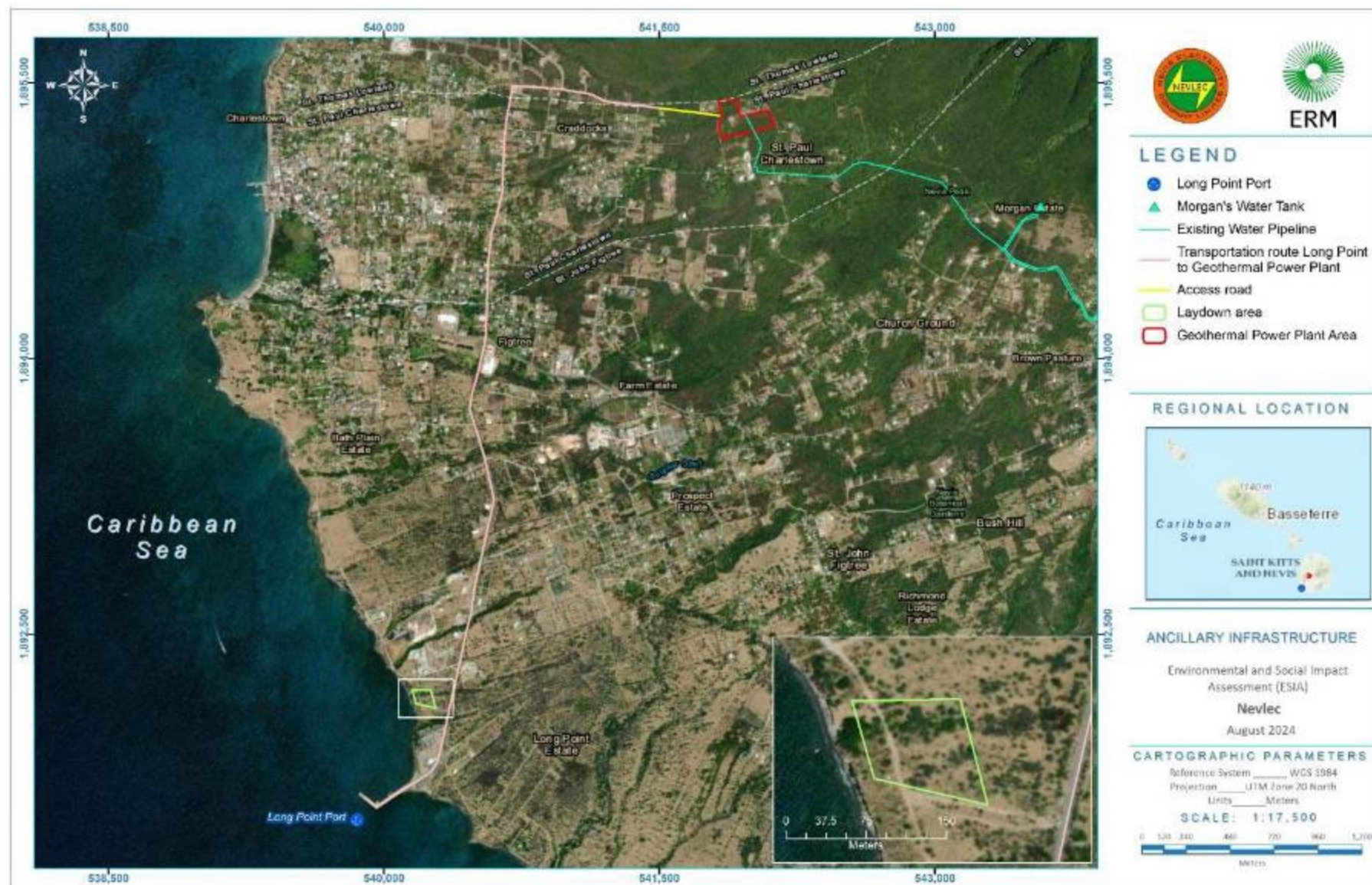


FIGURE 4.3 PLANVIEW OF N-4



Source: ERM site visit, August 2024.

4.4 THE PLUGGING AND ABANDONMENT PROCESS

The proposed P&A process will require cementing well N-4 until reaching surface level. According to NEVLEC's drilling consultant, the P&A of well N-3, if executed, would be done with the same cementing technique as well N-4.

The process steps are summarized as follows:

1. The drilling rig and associated equipment are mobilized and assembled over N-4 wellhead and cellar.
2. The drilling team will conduct a pre-spud meeting and rig inspections.
3. The Blowout Preventor Equipment (BOPE) is installed ("nipple up") on well N-4 after which pressure tests are conducted. Static well pressure must be zero.
4. Water is added in small amounts to reach zero pressure. This process is named 'quenching'.
5. Make up and run-in hole slick bottom hole assembly² (BHA) to 2,457 feet. As the BHA pulls in, it will clear and clean all obstructions.
6. Set rubber plugs to approximately 2,400 feet; then, sand is placed on top of the rubber plug.

² A slick BHA typically consists of a drill bit, drill collars, a heavy-weight drill pipe and a regular drill pipe. Slick BHAs normally do not have stabilizers. See: [BHA | Energy Glossary \(slb.com\)](#).

7. Squeeze cement slurry in the 7" x 4-1/2" casing to casing annulus. If the initial cementing is not successful, a casing cutter will be run in to cut the casing and pull it out of the hole (POOH) with a casing spear, after which the cementing can resume. However, if the initial cementing is successful, they will continue to the next step.
8. Run an open-ended drill pipe³ (OEDP) and conduct cement plugging in stages back to the surface.
9. Nipple down" (uninstall) the BOPE. The N-4 wellhead assembly is cut and removed. A weld-on steel plate is placed as cover to permanently seal the well. The area will remain fenced around the P&A well.
10. The rig is released.

For additional details, refer to the draft repair plan of well N-4, prepared by a drilling consultant (JND Consulting, October 2022, Appendix C). This plan is preliminary and will be further detailed by an Engineering, Procurement and Construction (EPC) contractor (also referred as "drilling contractor" or simply "contractor"), who has not been selected yet. Potential companies will participate in a bidding process through Q4-2024; and the selected company will prepare a workover program with a detailed technical description of the steps outlined above for P&A.

4.5 OTHER ACTIVITIES

NEVLEC, through its drilling contractor, plans to drill five large diameter geothermal wells⁴ (1 vertical and 4 directional), immediately after the P&A of well N-4. These activities are not captured as a part of this addendum; however, was inclusive in the scope of the ESIA/ESMP completed in 2022. Section 4.11 provides details related to schedule.

4.6 EQUIPMENT AND MATERIALS

4.6.1 DRILL EQUIPMENT

NEVLEC's contractor will have a conventional land rig with a minimum rig pull capacity of 68 tons and 300 horsepower (HP). The rig pump will have 2 units triplex pump with 200 HP each, with 90% mechanical efficiency. The rig itself will weigh approximately 80 tons.

In addition to the rig itself, the minimum associated equipment will be as follows:

- Annular and Ram Type Blowout Preventer Equipment (BOPE) – 7-1/16" ID x 2,000 psi rating with adapters to match existing wellhead assembly installed on well N-4.
- Complete 2-3/8" OD drill string (drill collar and drill pipe) with handling tools for use during mechanical cleanout of inside diameter of 4-1/2" OD, 11.6 lb/ft production casing to 2,400 feet.
- Cementing equipment spread complete with accessories (twin pumping cementing unit, high pressure lines, pressurized silo, compressor, cutting bottle, drill pipe cementing head, etc.).
- Three 3-7/8" OD tricone bit for mechanical cleanout inside the 4-1/2" OD production casing.

³ An OEDP is a drill pipe without a bit or other bottomhole assembly, generally used to place cement at a specific point in the wellbore. See: [Handbook of Best Practices for Geothermal Drilling \(energy.gov\)](https://www.energy.gov/handbook-of-best-practices-for-geothermal-drilling).

⁴ Three production Wells: N5, N6 and N7 and two injection Wells: I-1 and I-2.

- One 3-1/2" OD milling tool, which will be required in case the blockage cannot be cleared by tricone bit shallower than 1000 feet from surface.
- Casing cutter and casing spear with spare casing cutters and casing spear grapples – this will be used to cut 4-1/2" OD 11.6 lb/ft casing, if the initial cementing of the casing is unsuccessful (as explained in Section 4.4).

4.6.2 MATERIALS

The P&A process will require water, sand and cement. Minimum requirements are as follows:

- Water supply system capable of supplying the rig with a minimum and continuous flowrate of 500 gallons per minute⁵ (~32 liters/sec). Please see Section 4.8.1 on water requirements for further details.
- 400 sacks (94 lbs. each) of Class H or G cement. This includes 100% of cement contingency.
- Cement additives: the quantity is dependent on slurry tests; however, it is anticipated the Project will need 30-40% silica flour.
- Three cubic feet of sand.
- Two rubber plugs for 4-1/2" OD 11.6 lb/ft casing.

4.7 TEMPORARY INSTALLATIONS

The EPC contractor will be responsible of procuring temporary installations during the Project activities⁶, including:

- First Aid Facilities (fully equipped and maintained first aid medical kits)
 - All first aid medical supplies and non-prescription medications for the Contractor, Project Manager and Employer's third-party contractor personnel
- A Rig camp and Base Camp facilities. These facilities will support primarily subsequent drilling activities outside of the P&A project.
- Waste Transport Containers, marked in English for different waste types such as nonhazardous and hazardous, preferably color-coded. One set at rig and one set at base camp. Each set to consist of 3 each 1 cubic meter trash containers
- Portable toilets – one per 20 workers is a recommended ration (according to the US Occupational Safety and Health Administration, OSHA).
- Workers' rest area – to be used during breaks and as a rest area.
- One office space to accommodate 6 people each at the rig site for and dedicated to NEVLEC. The site will also have a conference table to accommodate minimum 10 people for visits and meetings. The space will allow installation of microwave, coffee maker, Wi-Fi, bathroom and sink
- Cement slurry test lab – located at the Site or near the Site. The laboratory shall provide the following services:

⁵ This estimate is for P&A only; Nevlec will require an estimated 1.5 million gallons a day for other Project activities to be done after the P&A (i.e., the drilling of 5 more wells in the Project site).

⁶ Temporary installations will be used for P&A and drilling activities

- Cement and cement additive material testing in accordance with API and ASTM Standards and recommended Practices
- Cement slurry testing in accordance with API and ASTM Standards
- The contractor will provide to the Project Manager:
 - test results in a timely manner and in the shortest possible time, and
 - test results that include rheology pressure/temperature, thickening times, thickening rate, free water, fluid loss, compressive strength time progress, curing process and cube compressive strength.

4.8 RESOURCES

4.8.1 WATER

As mentioned above, the P&A of well N-4 will require 500 gallons of water per minute; approximately 720,000 gallons a day, or 5.8 million gallons during the entire P&A phase, which will last eight (8) days under normal conditions. The Nevis Water Department will install an 8-inch, 8,000 feet long pipeline that will connect to a well from the Nevis Water Department to source water for the Project. The new line will be routed along the same route as an existing water line from Morgan's Reservoir to the Site. The water line layer is offset about 100 m from an existing road. The water lines are routed on the verge of the roadways and are within the Right of Way and likely to be underground. No land or assets (e.g., houses, structures) will be disrupted or impacted because of this installation.

NEVLEC will sign a lease with the Nevis Water Department before the end of 2024. The Water Department had already planned add an additional supply of 1.5 million gallons a day to the Nevis Water System. According to NEVLEC, the Water Department can provide enough water for the Project without affecting the Island's water supply.

For redundancy and emergencies, the site will store water (42,000 gallons) in a water tank. The rig contractor will install a temporary water supply system that c with specifications, including piping, valves, low pressure alarms, flow meters, and pumps, from the entrance to the well pad to the water tanks and mud tanks for future drilling, quenching, testing, including P&A operations. For potable water, the contractor will buy bottled water from a local supplier.

4.8.2 FUEL

The Project will require fuel for vehicles and diesel equipment. The drilling rig will use an average of 500 gallons of diesel fuel daily. The exact fuel quantities for vehicles, cement equipment, and emergency generators are not known and will need to be further confirmed by the EPC Contractor.

4.8.3 HAZARDOUS MATERIALS

For P&A, the only hazardous materials are cement additives (silica flour) and associated materials, such as empty cement cases and drums. Cement materials can cause irritation and damage to the skin and eyes. Additionally, fuel (gasoline and diesel) is flammable and toxic and will also be used to operate vehicles and heavy equipment.

The Project will not use drilling mud for P&A activities.

4.9 WASTE MANAGEMENT

All Project-associated waste (including liquid waste) will be disposed of at the Long Point Landfill, which receives hazardous and non-hazardous waste. The Nevis Solid Waste Management Authority handles all waste disposal activities on the Island.

4.9.1 HAZARDOUS WASTE

Any hazardous waste generated during operations will be handled in accordance with the Hazardous Waste Management Plan⁷. NEVLEC's EPC will implement Spill Prevention Control and Countermeasures (SPCC) to minimize the risk of spills.

4.10 WORKFORCE

The exact number of workers required for P&A is unknown. This will depend on P&A activities and the EPC contractor that is ultimately selected. However, according to NEVLEC's drilling consultant, the minimum staff required during P&A activities include the following outlined in the table:

TABLE 4.1 MINIMUM STAFF REQUIREMENTS

Role	No. People	Job Description
Rig manager	1	Oversees the daily operations of an oil or gas drilling rig. Responsibilities include ensuring the safety and efficiency of drilling activities, managing the rig crew, maintaining equipment, and ensuring compliance with environmental and regulatory standards. Also involved in coordinating with engineers, geologists, and other stakeholders to ensure that drilling operations stay on schedule and within budget. The Rig Manager also handles any issues that arise on the rig, including technical problems and personnel conflicts, to keep operations running smoothly.
Driller	1	Operates and controls drilling equipment on a rig. Primary responsibilities include drilling holes to specified depths, monitoring the drilling process, and ensuring the safety and efficiency of operations. In addition, also responsible for the maintenance and operation of drilling equipment, such as the drill string, drill bit, and drilling fluids. The driller also interprets drilling data, adjust drilling parameters, and respond to changes in downhole conditions. In addition to technical duties, the driller supervises the drilling crew, ensuring that tasks are carried out correctly and safely, and maintaining compliance with industry regulations.
Tool pusher	1	Oversees the entire drilling operation and managing the rig crew, ensure that drilling activities are conducted safely and efficiently, and maintain the rig's equipment and supplies. The Tool Pusher acts as the primary point of contact between the rig and the drilling contractor or operator, ensuring that the project stays on schedule and within budget. Key responsibilities include coordinating daily operations, implementing safety procedures, and troubleshooting any issues that arise on the rig. The tool pusher also handles administrative tasks, such as keeping records of drilling progress, equipment maintenance, and crew performance.

⁷ Supplemental Environmental and Social Impact Assessment (ESIA) 2022, Section 8.3.

Role	No. People	Job Description
Floor hand	1	Responsible for various manual tasks to support drilling operations. Primary duties include handling drill pipe, maintaining and cleaning the rig, and assisting the Driller and other crew members with rig operations. Floor Hands are also involved in setting up and dismantling equipment, as well as ensuring the work area is safe and organized.
Cement engineer	1	Specializes in designing and overseeing the cementing process in oil and gas wells. The primary role is to ensure that the cement used to secure the casing to the wellbore is properly mixed, applied, and set to create a strong and durable barrier. This is crucial for maintaining well integrity, preventing leaks, and isolating different underground formations. In addition, the cement engineer is responsible for troubleshooting any issues that arise during the process and to ensure that all activities comply with safety and environmental regulations.
Cement equipment operator	1	Responsible for operating and maintaining the equipment used in the cementing process of oil and gas wells. Some duties include setting up and running the cementing units, mixing cement according to specifications, and ensuring the accurate and efficient delivery of cement to the wellbore. Also involved in monitoring the cementing operation to ensure it meets safety and quality standards and troubleshoot any equipment or process issues that arise.
Cement crew	3	Each member of the cement crew has specific tasks, but they all work together to ensure the cement is applied correctly and meets project specifications. This team effort is vital for maintaining well integrity and preventing leaks.
Drilling engineer	1	Responsible for planning, designing, and overseeing the drilling operations for oil and gas wells. Their primary role is to ensure that wells are drilled safely, efficiently, and cost-effectively, while also meeting project objectives and complying with regulatory standards. Some key functions include well design and planning, operational oversight, safety, trouble shooting in the case of stuck pipe, blowout and equipment failure, compliance and cost management and collaborating with engineers and geologist to integrate drilling plans with overall project goals.
Drilling supervisor	1	Oversees and manages drilling operations, ensuring that all activities are conducted safely, efficiently, and according to plan. Plays a key role in the execution of drilling projects, acting as the on-site leader and primary point of contact between the rig crew and the company's management. Other key functions include quality control, reporting and day to day operational management ensuring project is carried out within time and budget.
Contractor's HSE supervisor	1	Responsible for ensuring that all health, safety, and environmental standards are maintained on a project site, particularly for contractor personnel. This role is crucial in minimizing risks, preventing accidents, and ensuring compliance with regulatory requirements during P&A activities, drilling, or other operational activities. Key functions encompass; risk management, incident investigation, develop, implement, and monitor HSE policies and procedures for contractor activities and ensure that all workers follow safety protocols and wear the necessary personal protective equipment (PPE).

Role	No. People	Job Description
NEVLEC's Chief Safety Officer	1	Responsible for the overall safety strategy and implementation across an organization. Their primary role is to develop, oversee, and ensure the effectiveness of the organization's health, safety, and environmental (HSE) policies and programs. Key functions include strategy development, training and awareness and incident management in accordance with local and international standards and regulations.
NEVLEC's Environmental and Social Officer	1	Responsible for ensuring that drilling activities are conducted in an environmentally responsible manner and in accordance with regulations and guidelines. Their key responsibilities align with developing systems for environmental monitoring and management for various impacts of an operation on areas such as water, waste, air, noise and biodiversity. This officer will also oversee social performance and the implementation of social plans from the Project, with the support of the HSSE support staff
NEVLEC's HSSE support	1	Assists in the implementation and maintenance of HSSE policies and procedures to ensure a safe and compliant work environment. Responsibilities are inclusive of supporting safety monitoring, emergency response and promoting a safety culture and practices and to ensure operations are in adherence to local and international safety regulations. Provides support to NEVLEC's E&S officer on social performance activities.
Total	15	

Source: Based on JD Consulting.

As seen above, NEVLEC will hire the three (3) people in charge of overseeing HSSE aspects during Project activities, who will be locals. A local social specialist will also be recruited to guide the implementation of the Environmental and Social Management Plans. The other positions on the table above will comprise of expats, as it is very specialized work.

4.10.1 WORKER'S ACCOMMODATIONS

The EPC Contractor's workers will have dedicated accommodation close to the Project site. Currently, it is planned to rent apartments at the "Carino Hamilton Development"⁸, which comprises two-story apartment buildings south of the Project. The location of these apartments is shown in Appendix A. NEVLEC/the Contractor will confirm vacancy with the Development. There are also residential apartments north of the Project site that can be used as alternative accommodations; however, the exact details have not been confirmed.

4.11 SCHEDULE

NEVLEC is currently preparing bidding documents to select the EPC Contractor, and the aim is to sign an agreement with the selected firm by January 2025, contingent upon obtaining all applicable permits. Once the contractor agreement is executed, the following milestones will occur:

- Mobilization to the site: February 2025 (full mobilization takes six months, but some activities will develop throughout and before the end of mobilization).

⁸ <https://www.carinonevis.com/>; Google maps location: <https://maps.app.goo.gl/p9T4e4aHC1Wx8a8F8>.

- Plugging and abandonment activities: May 2025.
 - This activity is estimated to take 8 to 10 days; it may take longer depending on the well conditions.
- Drilling of new wells which are covered in the scope of ESIA/ESMP 2022, is estimated to take 40 days per well, on average (there will be five new wells). Drilling times may change depending on the conditions of each well.

The exact dates of each milestone are not known currently.

4.12 ALTERNATIVE ANALYSIS

This section summarizes the different alternatives considered for the development of this Project, including different P&A techniques, equipment transportation routes, location of laydown areas and a no action alternative.

4.12.1 NO ACTION ALTERNATIVE

If no action is taken, well N-4 may pose a safety risk that will increase over time. Once the drilling activities for the production and injection wells commence, there is a potential risk of hydraulic communication between wells, leading to uncontrolled hot fluid steam discharges. This risk is attributed to the Project's location on an active shallow reservoir zone.

4.12.2 PLUGGING TECHNIQUE: "CUT AND PULL" VS CEMENTING FOR P&A

According to JD Consulting, there are two primary repair options for well N-4:

- Option 1. describes the 'Cut and Pull' method, where 1,000 feet of 4-½" casing would be extracted and a cement plug 7" liner to surface. The risk rating for Option 1 is **High** as the extraction may not be successful on the first attempt and time exceeded due to casing centralizers installed on the body of casing.
- Option 2. describes the clean out and cementing inside the casing and annulus back to surface. The risk ranking for Option 2 is **Medium** due to the small open-ended drill pipe used and longer wait on cement.

Option 2 will cost significantly less and will take less time than Option 1 and is considered the more practical, cost-effective and is a less risky option according to JD Consulting. If N-3 eventually undergoes P&A, cementing would also be the preferred option for the same reasons.

4.12.3 LOCATION OF THE LAYDOWN AREA

The current laydown area designated for the Project is located near Long Point Port. The plan is to use the Long Point Port laydown area to provide storage and staging for Project materials without affecting the Port's storage capacity. This land is government property; however, it would require the contractor to transport all major equipment as needed, along a 5.4 km road to the Project site. This would involve more time and logistics for the use of equipment, although the area is clear of vegetation, state-owned and ready to use.

As stated in the Draft Hazard and Risk Assessment report prepared by JD Consulting (see Appendix D), an alternative approach would be to use a temporary laydown area east adjacent to the work

site, which is privately owned⁹. The 2.2 acres laydown area would be used for temporary storage and parking during operations. This area is next to the site, which is more convenient in terms of location, but it would require acquiring land and clearing vegetation. NEVLEC has stated that if land negotiations and permits are not obtained in time to start the Project, the area close to Long Point Port will be used.

Figure 4.1 shows the location of Long Point Port laydown area along with the transportation route, and Figure 4.2 displays the potential laydown area adjacent to the site.

4.12.4 TRANSPORTATION ROUTE

NEVLEC will support the coordination and logistics of transporting equipment from Long Point port to Charlestown and will implement a Traffic Management Plan, available in the 2022 ESIA/ESMP. For the most part, the road is paved and straight to transport major equipment, including a rig that weighs approximately 80 tons. However, the last segment (less than 1 km) has curves and turns. NEVLEC is proposing to instead pave the last 1,600 feet (480 m) of an existing dirt road and provide a direct access to the site, which is currently unavailable. The Ministry of the Public Works (or alternately, a local developer, depending on the available budget) would pave the existing road located 1,600 feet west of the Project Site (Figure 4.2). The road will be used to transport equipment to the site. Using such road will create a straight path to the Project site and avoid a roadway with multiple turns. Upon completion, the path will be called 'Pump Road' and will be used as a bypass road for heavy vehicles and machinery.

In addition, the Director of Public Works assessed that drain bridges can take the weight of the rig when driving through but not if parked (based on the design). The department was consulted by NEVLEC to seek further clarification. NEVLEC is not aware yet about how many trips or trucks will be required.

It is recommended that the Ministry of Public Works conducts maintenance on roads used to transport heavy equipment. The Ministry of Public Works will determine the schedule and nature of maintenance works after the transport of equipment. At the time of drafting this addendum, no maintenance is planned to occur before the Project activities.

⁹ Any land acquisition will be in accordance with local laws and relevant safeguard policies.

5. IMPACT ASSESSMENT

The primary purpose of an Impact Assessment is to determine the likely Environmental and Social impacts resulting from the proposed Project. Impacts can be direct, indirect, or induced, as defined in Table 5.1. Impact significance is determined based on the receptors’ sensitivity and the magnitude of the impact, as shown in Table 5.2. Please refer to the 2022 ESIA prepared by ERM for a full description of the impact assessment methodology.

TABLE 5.1 IMPACT DESIGNATION DEFINITIONS

Designation	Definitions
Direct	Impacts that result from a direct interaction between the Project and a resource/receptor (e.g., between disturbance of a plot of land and the habitats on that plot of land that are affected).
Indirect	Impacts that follow from the direct interactions between the Project and its environment because of subsequent interactions within the environment (e.g., viability of a species population resulting from loss of part of a habitat because of the Project occupying a plot of land).
Induced	Impacts that result from other activities (which are not part of the Project) that happen because of the Project (e.g., influx of camp followers resulting from the presence of a large Project workforce).
Cumulative	Impacts that result from the successive, incremental, and/or combined effects of an action, project, or activity added to other existing, planned, and/or reasonably anticipated actions, projects, or activities. For practical reasons, the identification, assessment, and management of cumulative impacts are limited to those effects generally recognized as important based on scientific concern and/or concerns of Project-Affected Communities.

Source: ERM, 2020.

TABLE 5.2 IMPACT SIGNIFICANCE MATRIX

Impact Magnitude	Sensitivity of the Resource or Receptor		
	Low	Medium	High
Negligible	Negligible	Negligible	Negligible
Small	Negligible	Minor	Moderate
Medium	Minor	Moderate	Major
Large	Moderate	Major	Major

Source: ERM, 2012.

The impacts identified are described in the following subsections. ERM did not find new impacts; rather, it described how P&A activities can contribute to changing the significance of previously identified impacts from the 2022 ESIA. Where changes in significance were identified, a note is provided. To describe P&A impacts in context with the wider geothermal Project, ERM has kept the original impact description for future production and injection wells (also found in the 2022 ESIA).

5.1 PHYSICAL IMPACT ASSESSMENT

Table 5.3 lists identified impacts for NEVLEC's geothermal Project to the physical environment. Additional measures for P&A activities were included where applicable.

5.2 BIODIVERSITY IMPACT ASSESSMENT

lists identified impacts for NEVLEC's geothermal Project to biodiversity. Additional measures for P&A activities were included where applicable.

5.3 SOCIOECONOMIC IMPACT ASSESSMENT

Table 5.5 lists identified impacts for NEVLEC's geothermal Project to the socioeconomic environment. Additional measures for P&A activities were included where applicable.

5.4 CULTURAL HERITAGE IMPACT ASSESSMENT

Table 5.6 lists potential impacts to cultural heritage.

TABLE 5.3 SUMMARY OF IMPACTS TO PHYSICAL RECEPTORS

Number	Receptor	Impact	Sensitivity	Magnitude	Pre-mitigation Impact Significance	Mitigation Measures	Residual Impact Significance
1.	Groundwater	Water quantity/availability	Medium	Medium	Moderate	Water quantity measures: <ul style="list-style-type: none"> Monitor water flow rate and usage to detect leaks and keep water usage within the estimated quantities Engage and coordinate with the water department to make sure NEVLEC's consumption is within the stipulated limits and not impede water for the Island 	Minor
2.		Water Quality	High	Small	Moderate	2022 ESMP measures: <ol style="list-style-type: none"> 1.1. Implement a Soil erosion and Sediment Control and Drainage Control plan 1.2. Store all fuels, lubricants, and other hazardous materials used in operations in appropriate storage tanks and located in bermed areas to provide secondary containment 1.3. Adopt and implement a Spill Prevention and Countermeasure (SPCC) Plan to minimize the potential for accidental spills 1.4. Water quality testing, including temperature, pH, turbidity, conductivity, nitrates, phosphates, sulphates using a multiparameter device. Water quality should be monitored daily during construction and/or P&A activities. <ul style="list-style-type: none"> Ensure proper handling, storage, and disposal of hazardous waste materials to prevent leaks and spills. P&A additional measures: <ol style="list-style-type: none"> 1.6. Barricade N-4 to prevent accidental spills or leaks to reach the well 	Minor
3.	Soil	Soil erosion and landslides	Low	Negligible	Negligible	2.1. Plant vegetation along steep slopes 2.2. Prepare and implement a Soil Erosion and Sediment Control Plan 2.3. Use appropriate best management practices during clearance activities 2.4. Reuse excavated material P&A additional measures: <ul style="list-style-type: none"> None 	Negligible
		Soil contamination	Low	Small	Negligible	2.5. Preventive maintenance programs for equipment and vehicles (according to manufacturer requirements) 2.6. Properly store and use of fuel and hazard materials P&A additional measures: <ol style="list-style-type: none"> 2.7. Adopt and implement a Spill Prevention and Countermeasure (SPCC) Plan to minimize the potential for accidental spills Implement the Waste Management Plan <ul style="list-style-type: none"> Disposal of waste materials, both solid and fluid, shall be in accordance with local regulations, good hygiene, and good construction practice, 	Negligible
		Loss of soils suitable for agriculture	Low	Negligible	Negligible	2.8. Minimize Project footprint to the maximum extent possible; stabilize disturbed areas P&A additional measures: <ul style="list-style-type: none"> None 	Negligible
4.	Air Quality	Potential increase in H ₂ S concentrations	Medium	Medium	Moderate	3.1. Use abatement systems to remove H ₂ S emissions from non- condensable gases 3.2. Install H ₂ S monitors within and beyond boundary of project site P&A additional measures: <ol style="list-style-type: none"> 3.3. Install H₂S monitors and have workers that will work in the cellar to use portable H₂S detectors 3.4. When detecting H₂S, use a blower fan to drive away the gas from the cellar 	Minor
5.	Noise	Increase in noise levels	Medium	Medium	Moderate	4.1. Implement Noise Management Plan P&A additional measures: <ul style="list-style-type: none"> None 	Minor

Number	Receptor	Impact	Sensitivity	Magnitude	Pre-mitigation Impact Significance	Mitigation Measures	Residual Impact Significance
5.	Natural Hazards	Occurrence of natural hazards	Medium	Medium	Moderate	5.1. Implement Emergency Response and Preparedness Plan P&A additional measures: • None	Minor

TABLE 5.4 SUMMARY OF IMPACTS TO BIODIVERSITY RECEPTORS

Number	Receptor	Impact	Sensitivity	Magnitude	Pre-mitigation Impact Significance	Mitigation Measures	Residual Impact Significance
1.	Terrestrial Vegetation	<i>Direct:</i> Ground works will result in the direct loss and disturbance of vegetation and secondary natural forest within the road improvement/expansion locations, exploration well pads, injection pads and immediate surrounding areas	Medium	Small	Minor	1.1. Minimize Project footprint to the maximum extent feasible 1.2. Avoid removal of trees where possible 1.3. Maintain vegetation barriers along north, south and eastern borders as feasible 1.4. Technical delimitation of authorized clearing areas, using security tape at a height of 1.5 m, visible enough to isolate the intervention area, and implementation of enforcement measures to avoid footprint “creep” into surrounding areas. P&A additional measures • None	Negligible
		<i>Direct:</i> Ground works will result in the temporary loss and disturbance of vegetation and wildlife habitat within temporary construction laydown areas	Medium	Small	Minor	1.5. Minimize temporary construction impacts to the maximum extent possible 1.6. Avoid removal of trees where possible 1.7. Restore and revegetate temporary laydown areas post construction P&A additional measures • None	Negligible
		<i>Direct:</i> Ground works and Project-related vehicle traffic and equipment brought from foreign countries may introduce or spread invasive and exotic plant species	Low	Small	Negligible	1.8. Regular washing of Project related vehicles 1.9. Inspection of all equipment with arrival of overseas equipment 1.10. Revegetation and restoration of temporary laydown areas with native and endemic species, if feasible P&A additional measures • None	Negligible
		<i>Indirect:</i> Equipment from foreign countries may introduce invasive insect pests that could cause disturbance to natural vegetation species in the Project Area	Low	Small	Negligible	1.11. Inspection of all equipment with arrival of overseas equipment 1.12. Follow Nevis pest mitigation and suppression regulations P&A additional measures • None	Negligible
		<i>Indirect:</i> Project-related vehicular traffic and site preparation activities may create dust, the accumulation of which can inhibit vegetative growth	Low	Small	Negligible	1.13. Implement dust control procedures (e.g., watering) when needed to control dust P&A additional measures • None	Negligible
		<i>Direct:</i> Unforeseen accidents, such as a geothermal well blowout, will cause disturbance and mortality of nearby vegetation	High	Medium	Moderate	1.14. Installation of a blowout prevention equipment (BOPE) 1.15. Regularly inspect the BOPE to ensure that the equipment operates and conforms to industry standards	Negligible

Number	Receptor	Impact	Sensitivity	Magnitude	Pre-mitigation Impact Significance	Mitigation Measures	Residual Impact Significance
						1.16. Implement the emergency Well Blowout Prevention Plan and Emergency shut-in plan to contain and clean up any fluids that may be released 1.17. Restore and revegetate affected areas after accident	
		<i>Indirect:</i> Operation of the drill rig and related drilling and testing activities will generate air emissions, the accumulation of which could inhibit growth of vegetation	Negligible	Negligible	Negligible	1.18. Monitor air quality daily during construction activities to meet IFC EHS standards 1.19. Implement air quality management plan P&A additional measures • None	Negligible
		<i>Indirect:</i> Project-related influx of workers in the area could indirectly increase harvesting to produce charcoal or increase domesticated animal grazing	Low	Small	Negligible	1.20. Design and implement a Community Wildlife Management Education training P&A additional measures • None	Negligible
2.	Terrestrial Wildlife	<i>Direct:</i> Habitat loss for wildlife due to construction within the road improvement/ expansion locations, exploration well pads, injection pads and immediate surrounding areas (total 5 acres or 2 ha), as well as temporary laydown areas (2.2 acres or 0.89 ha)	Medium	Small	Minor	2.1. Minimize Project footprint to the maximum extent feasible 2.2. Avoid removal of trees where possible 2.3. Maintain vegetation barriers along north, south and eastern borders as feasible 2.4. Restore and revegetate temporary laydown areas for wildlife habitat 2.5. Technical delimitation of authorized clearing areas, using security tape at a height of 1.5 m, visible enough to isolate the intervention area, and implementation of enforcement measures to avoid footprint “creep” into surrounding areas. P&A additional measures • None	Negligible
	Terrestrial Wildlife (continued)	<i>Direct:</i> Vegetation clearing, and construction may result in disturbance, injury, or mortality for wildlife within the Project Area	High	Medium	Moderate	2.6. Conduct pre-clearing surveys prior to site preparation activities 2.7. Conduct bat roost surveys to scare away prior to site preparation activities by implementing humane physical or acoustic exclusion measures to keep bats away from site 2.8. Rescue and relocate sessile species to undisturbed sites P&A additional measures • None	Negligible
		<i>Direct:</i> The use of heavy machinery and increased vehicular traffic along access roads could result in direct mortality or injury of wildlife occurring within the Project Area	Low	Small	Minor	2.9. Conduct pre-clearing surveys prior to site preparation activities to flush wildlife from the activity areas 2.10. Relocate sessile species to undisturbed sites 2.11. Assess areas of wildlife crossing and install road signs P&A additional measures • None	Negligible
		<i>Direct:</i> Increased vehicular traffic along roads could result in direct mortality or injury of wildlife occurring within the Project Area	Low	Small	Minor	2.12. Implement a Worker Health and Safety Management Plan, which includes strict enforcement of speed limits and limit nighttime driving 2.13. Assess areas of frequent wildlife crossing and install road signs P&A additional measures	Negligible

Number	Receptor	Impact	Sensitivity	Magnitude	Pre-mitigation Impact Significance	Mitigation Measures	Residual Impact Significance
						<ul style="list-style-type: none"> None 	
		<i>Indirect:</i> Operation of the drill rig and related drilling and testing activities will generate air emissions, the accumulation of which could adversely affect susceptible wildlife	Negligible	Negligible	Negligible	2.14. Monitor air quality to meet IFC EHS standards 2.15. Implement air quality management plan P&A additional measures <ul style="list-style-type: none"> None 	Negligible
		<i>Direct:</i> Harassment by Workers during construction and operations to wildlife causing disturbance, mortality and injury within the Project area	High	Large	Moderate	2.16. Design and implement a worker Wildlife Management education training 2.17. Implement Worker Health and Safety Management Plan that prohibits hunting and harassment of wildlife on Project site and vicinity 2.18. Installation of no disturbance, no hunting or harassment of wildlife signs in work areas 2.19. Installation of informative signs of biodiversity P&A additional measures <ul style="list-style-type: none"> None 	Negligible
		<i>Direct:</i> The use of heavy machinery during construction and well drilling may generate localized vibrations sufficient to harm ground-dwelling terrestrial wildlife	High	Medium	Moderate	2.20. Implement pre-construction surveys to relocate ground-dwelling wildlife from the activity sites to the extent practicable. 2.21. Assess the need of a shock absorber, or damper on the drill P&A additional measures <ul style="list-style-type: none"> None 	Minor
		<i>Direct:</i> During construction of the drill rig, blow testing, and other construction activities, the Project will generate high noise levels causing wildlife displacement and mask acoustic calling, thus affecting mating and feeding behaviors, within the Project area	High	Medium	Moderate	2.22. Implement the noise reduction measures 2.23. Install temporary sound barriers, if construction is not during hurricane season 2.24. Maintain vegetation barriers surrounding Project Area 2.25. Install silencers to vehicles and heavy equipment 2.26. Survey areas for existing bat roosts and implement humane physical or acoustic exclusion measures to keep bats away from site 2.27. Avoid drilling and steam blow testing, as feasible, between April and August to avoid impacts on maternity colonies of bats, and bird breeding season 2.28. Construction of an earthen berm to help mitigate sound P&A additional measures <ul style="list-style-type: none"> None 	Minor
	Terrestrial Wildlife (continued)	<i>Direct:</i> High noise levels from air condensers and generators causing wildlife displacement and mask acoustic calling, thus affecting mating and feeding behaviors, within the Project area	Low	Small	Minor	2.29. Implement the noise reduction measures defined above 2.30. Provide regular maintenance to vehicles 2.31. Maintain vegetation barriers surrounding Project Area 2.32. Construction of an earthen berm to help mitigate sound P&A additional measures <ul style="list-style-type: none"> None 	Negligible
		<i>Indirect:</i> Artificial night lighting which could act as attractants for night-migrating or nocturnal species, increasing the potential for collision with lighting structures, increased energy expenditure, or increased predation	Medium	Large	Moderate	2.33. Minimize the amount of artificial lighting used at the pad sites 2.34. Use directional lighting (downward facing lighting) and direction accessories	Minor

Number	Receptor	Impact	Sensitivity	Magnitude	Pre-mitigation Impact Significance	Mitigation Measures	Residual Impact Significance
						2.35. Avoid the use of UV light P&A additional measures • None	
		<i>Indirect:</i> Project-related influx of workers in the area could indirectly increase hunting and bird poaching pressure	Low	Small	Minor	2.36. Design and implement a Community Wildlife Management education training 2.37. Implement Worker Health and Safety Management Plan that prohibits hunting and harassment of wildlife within Project vicinity P&A additional measures • None	Negligible
		<i>Direct:</i> Unforeseen accidents, such as a geothermal well blowout, will cause disturbance and degradation to habitat, and injury and mortality of nearby wildlife	High	Medium	Moderate	2.38. Installation of blowout prevention equipment (BOPE) 2.39. Regularly inspect the BOPE to ensure that the equipment operates and conforms to industry standards 2.40. Implement the emergency shut-in plan to stop a well blowout and contain and clean up any fluids that may be released 2.41. Install fences around immediate Project well pads P&A additional measures • None	Minor
		<i>Direct:</i> Vegetation clearing may result in disturbance, injury or mortality for rare and endemic flora and fauna within the Project Area	High	Medium	Moderate	2.42. Conduct pre-clearing surveys prior to site preparation activities 2.43. Rescue and relocate sessile rare and endemic fauna and flora to undisturbed sites P&A additional measures • None	Negligible
		<i>Indirect:</i> Project-related vehicular traffic and site preparation activities may create dust, which can inhibit rare and endemic plants	Low	Small	Minor	2.44. Implement dust control procedures (e.g., watering) when needed to control P&A additional measures • None	Negligible
		<i>Direct:</i> The use of heavy machinery and well drilling may generate localized vibrations sufficient to harm ground-dwelling rare and endemic terrestrial fauna	High	Medium	Moderate	2.45. Implement pre-construction surveys to relocate ground dwelling wildlife from the activity sites to the extent practicable. 2.46. Assess the need of a shock absorber, or damper P&A additional measures • None	Minor
3.	Rare and Endemic Species (continued)	<i>Direct:</i> During the use of the drill rig and blow testing will create noise (see Section 5.2.3), causing displacement of rare and endemic fauna from the Project Area.	High	Medium	Moderate	3.1. Implement the noise mitigation measures 3.2. Maintain vegetation barrier around Project Areas 3.3 Install sound barriers during construction if not within hurricane season P&A additional measures • None	Minor
		<i>Indirect:</i> Artificial lighting will create disturbance and displacement of light-sensitive rare and endemic animal species and lights could act as attractants for night-migrating or nocturnal species, increasing the potential for collision with lighting structures, increased energy expenditure, or increased predation	Medium	Large	Moderate	3.4. Minimize the amount of artificial lighting used at the pad sites 3.5. Use directional lighting (downward facing lighting) and direction accessories	Minor

Number	Receptor	Impact	Sensitivity	Magnitude	Pre-mitigation Impact Significance	Mitigation Measures	Residual Impact Significance
						3.6. Avoid the use of UV light P&A additional measures • None	
		<i>Direct:</i> Harassment by Workers during activities to wildlife causing disturbance, mortality and injury within the Project area	Medium	Large	Moderate	3.7. Design and implement a worker Wildlife Management education plan 3.8. Implement Worker Health and Safety plan which prohibits wildlife hunting activities, poaching, or any form of harassment 3.9. Installation of no disturbance, no hunting or harassment of wildlife signs in work areas 3.10. Installation of informative signs of biodiversity P&A additional measures • None	Negligible
		<i>Direct:</i> Unforeseen incident, such as a geothermal well blowout, will cause disturbance, injury and mortality of nearby rare and endemic fauna and flora	High	Medium	Moderate	3.11. Installation of blowout prevention equipment 3.12. Regularly inspect the BOPE to ensure that the equipment operates and conforms to industry standards 3.13. Implement the emergency Well Blowout Prevention Plan and Emergency shut-in plan to contain and clean up any fluids that may be released 3.14. Install fences around immediate Project well pads P&A additional measures • None	Minor
4.	Protected Areas	<i>Indirect:</i> Project-related activities will result in the temporary degradation of habitat quality within the nearby Nevis Peak	Low	Small	Negligible	4.1. Implement noise mitigation measures 4.2. Implement Waste Management plan 4.3. Implement the emergency Well Blowout Prevention Plan 4.4. Design and implement a worker Wildlife Management education training 4.5. Implement Worker Health and Safety Management Plan that prohibits hunting and harassment of wildlife within Project vicinity P&A additional measures • None	Negligible

TABLE 5.5 SOCIOECONOMIC IMPACTS BY RECEPTOR

Number	Receptor(s)	Impact	Sensitivity	Magnitude	Pre-mitigation Impact Significance	Mitigation Measures	Residual Significance
1.	Residents and businesses near the exploration drill pads and injection pads	Stress on local infrastructure (housing, businesses)	Low	Medium	Minor	1.1. Community Grievance Mechanism 1.2. Local Employment and Supplier Development Plan 1.3. Liaise with Ministry of Housing to assist in seeking suitable accommodations and setting rental rates to not drive-up other costs in Project area 1.4 Implement the Community Health and Safety Plan P&A additional measures: • None	Negligible
2.	Populations in the nearest settlements to the Project area	Stress on local infrastructure (housing, businesses)	Low	Medium	Minor	2.1. See Stress on Local Infrastructure Project Controls above (1) 2.2 For residents near the unpaved road, there will be a temporary disruption in access to their homes. NEVLEC will discuss with the owners and add signage to alternative routes. 2.3 Implement the external grievance mechanism and Stakeholder Engagement Plan P&A additional measures: • None	Negligible
3.	Existing potential workforce in Project-affected communities	Economic benefits	Positive	Positive	Positive	3.1. Implement the Labor Conditions and the Workers Selection Management Plan and Workers' Health and Safety Management Plan 3.2. Share the Labor and Workers Selection Management Plan transparently with Project and Other Affected Communities to manage employment expectations 3.3. Give talks to the community, targeting women, to inform them of the employment opportunities in construction work and in general in geothermal energy 3.4. Conduct trainings for women interested in participating in the project 3.5. Ensure contractors adhere to the Local Employment and Supplier Development Plan 3.6. Implement the internal grievance mechanism and the Contractor Management Plan during all Project phases 3.7. Implement the Training Plan for workers 3.8. If the Project retains security personnel, implement the Security Management Plan; otherwise NEVLEC's E&S Officer will ensure security measures in said plan are implemented P&A additional measures: • None	Positive
4.	Existing businesses in the towns	Economic benefits	Positive	Positive	Positive	4.1. Economic Benefits Project Control P&A additional measures: • None	Positive
5.	Vulnerable groups (Women)	Economic benefits	Medium	Medium	Moderate	5.1. Mainstreaming job opportunity information and emphasizing that NEVLEC is open to women applicants.	Positive

Number	Receptor(s)	Impact	Sensitivity	Magnitude	Pre-mitigation Impact Significance	Mitigation Measures	Residual Significance
						5.2. See additional mitigation measures in Workers Selection Management Plan. 5.3. Gender Action Plan P&A additional measures: • None	
6.	Local and foreign tourists at Hamilton Estate	Tourism	Medium	Medium	Moderate	6.1. Ensure Traffic Management Plan includes continued daytime access to Hamilton Estate 6.2. Create interpretative and educational signage at Hamilton Estate related to Project activities 6.3. Develop plans with Ministry of Tourism for tours of Project site (if feasible) and generate positive sentiment amongst tourists about the environmental advantages of geothermal power 6.4. Implement monitoring plans which track and evaluate data on tourist experience in relation to Project impacts. P&A additional measures: • None	Minor
7.	Residents and businesses near the well pad	Noise	High	Medium	Moderate	7.1. Implement Noise Management Plan and the SEP, including notifying affected communities before the start of works, P&A additional measures: • None	Minor
		Traffic	Medium	Low	Minor	7.2. Transportation Management Plan and Emergency Response Plan 7.3. Minimize truck deliveries during peak hours. Enforce a Journey Management Plan for truck deliveries. 7.4. Provide traffic controls (flaggers) where conduit installation temporarily reduces road width. 7.5. Provide buses for construction worker transport. P&A additional measures: • None	Negligible
		Dust	Medium	Medium	Moderate	7.6. Implement Traffic and Transportation Management Plan 7.7. On-site dust abatement measures P&A additional measures: • None	Minor
		H ₂ S Emissions	Low	Medium	Minor	7.8. There will be H ₂ S monitors installed to maintain concentrations below IFC and EHS Guidelines. There will be adequate ventilation to prevent H ₂ S accumulation. Workers will be provided with PPE to protect them from H ₂ S emissions. 7.9. Implement Community Health and Safety Management Plan and in case of an emergency, the Emergency Preparedness and Response Plan P&A additional measures: • Workers in the cellar will have portable H ₂ S detectors • Any excess of H ₂ S will be blown away with a fan • Only authorized workers will be allowed in the cellar	Negligible
		Land Use	Medium	Medium	Moderate	7.10. See tourism control and aesthetic resources measures (6.3) 7.11. If land is acquired, follow the guidelines on PS5 P&A additional measures:	Minor

Number	Receptor(s)	Impact	Sensitivity	Magnitude	Pre-mitigation Impact Significance	Mitigation Measures	Residual Significance
						<ul style="list-style-type: none"> None 	
		Water Use	Medium	Medium	Moderate	7.12. The Project will have a water tank to have redundancy and in case of emergency 7.13. The Water Department will drill additional wells to have enough water into their system, which will allow to meet NEVLEC's demand without interfering with the Islands' supply	Minor
8.	Populations in the nearest settlements to the Project area	Noise	High	Medium	Moderate	8.1. See Noise Project Controls above (7.1)	Minor
		Traffic	Medium	Low	Minor	8.2. See Traffic Project Controls above (7.4)	Negligible
		Dust	Medium	Medium	Moderate	8.3. See Dust Project Controls above (7.7)	Minor
		H ₂ S Emissions	Low	Medium	Minor	8.4. See H ₂ S Project Controls above (7.8)	Negligible
		Land Use	Medium	Medium	Moderate	8.5. See Tourism Project Controls above (6.3) 8.6. See Aesthetic Resources,	Minor
		Water Use	Medium	Medium	Moderate	8.7. See Water Resources	Minor
9.	Populations residing and working along roads from Project area to Port	Traffic	Low	Medium	Minor	9.1. See Traffic Controls above (7.4)	Negligible
10.	Residents and businesses in the Area of Influence	Community Health, Safety and Security	Medium	Medium	Moderate	10.1. See Community Health and Safety Mitigation Measures and Emergency Preparedness and Response Plan P&A additional measures: <ul style="list-style-type: none"> None 	Minor
11.	Commercial Port Users, Vessels in waters near Long Point Port	Traffic and port capacity	Low	Low	Negligible	<ul style="list-style-type: none"> None. 	Negligible
12.	Road users	Road Capacity and Congestion	Medium	Low	Minor	12.1. See Traffic Project Controls above (7.4)	Negligible
		Road Infrastructure	Medium	Medium	Moderate	12.2. Require trailer transport of tracked vehicles. Conduct pre-construction inspection of haul route from port to Project site. 12.3. Monitor road conditions during activities and inspect haul route at conclusion. 12.4. Communicate with the Nevis Public Works Department about road repair needs. P&A additional measures: <ul style="list-style-type: none"> None 	Negligible
		Road Capacity and Congestion	Medium	Low	Minor	12.5. See Traffic Project Controls above (7.4)	Negligible
13.	Residents and businesses near the exploration drill pads and injection pads	Aesthetics	Medium	Medium	Moderate	13.1. Minimize vegetative clearing Use lowest safe lighting intensity 13.2. Use downward-facing full-cutoff lighting. Paint buildings similar colors as surrounding vegetation.	Minor

Number	Receptor(s)	Impact	Sensitivity	Magnitude	Pre-mitigation Impact Significance	Mitigation Measures	Residual Significance
						13.3 Implement NEVLEC's code of conduct and a zero tolerance for gender-based violence and harassment, as prescribed in the Labor Conditions and Workers Selection Plan. P&A additional measures: • None	
14.	H&S Risk to workers	Potential for minor and major injuries to team	Medium	Moderate to High	Moderate	14.1. Conduct H&S debriefs and toolbox talks daily to communicate key details and work plan / progress. 14.2. Ensure all workers are equipped with and enforce wearing of necessary PPE 14.3. Ensure workers are aware of emergency escape routes or muster points in case of an emergency. 14.4. Build capacity amongst teams to respond to any injury or illness and disseminate details such as route to the nearest medical facility in case of significant accidents.	Minor

TABLE 5.6 CULTURAL HERITAGE IMPACTS

Receptor	Impact	Sensitivity	Magnitude	Pre-mitigation Impact Significance	Mitigation Measures	Residual Significance
Hamilton Estate Plantation	Direct Impacts	Medium	Minor	Minor	• Chance Find Plan Procedure P&A additional measures: • None	Negligible
Hamilton Estate Plantation	Indirect Impacts	Medium	Medium	Moderate	• No disruption of access to the Hamilton Estate sugar work ruins P&A additional measures: • None	Minor

6. ENVIRONMENTAL AND SOCIAL MANAGEMENT PLAN

As part of the 2022 ESIA, ERM prepared an Environmental and Social Management Plan (ESMP) for the Geothermal Drilling Project which include measures to avoid, mitigate, minimize and compensate negative E&S risks and impacts for the Project, and enhance positive impacts whenever possible. These Measures were designed considering both typical and standard P&A activities impacts (i.e., many applicable to the P&A of well N-4) and others specific to impacts for other activities in the Geothermal Drilling Project such as well drilling (discussed in the 2022 Supplemental ESIA/ESMP). The Measures are part of an integrated system; measures that will be applied to well N-4 P&A do not come from separate or independent Plans; rather, they are included and considered in the ESMP for the Geothermal Drilling Project. Table 6.2 summarizes NEVLEC's ESMP enlisting the measures applicable for the well N-4, for the purpose of this addendum. Please refer to the 2022 Supplemental ESIA to consult NEVLEC's complete ESMP.

6.1 ROLES AND RESPONSIBILITIES

Table 6.1 lists key roles and responsibilities for the Project; the positions below are the minimum require to implement the ESMP. The contractor will have its own staff and may have additional roles and counterpart positions for the implementation of mitigation measures. In addition, for P&A activities, a minimum staff table can be found on Table 4.1.

TABLE 6.1 NEVLEC KEY ROLES AND RESPONSIBILITIES

Role	Responsibilities
Project Director	<ul style="list-style-type: none"> Be familiarized with, review and approve Management Plans as deemed necessary Ensure the availability of resources necessary for the implementation of Management Plans
Chief Safety Officer	<ul style="list-style-type: none"> Assure the correct implementation of Management Plans
Environmental Officer	<ul style="list-style-type: none"> Make sure NEVLEC obtains all necessary permits for planned activities Assure the correct implementation of Management Plans Update Management Plans Respond to detections of contaminants of concern Review and approve the contractor project-specific Management Plans Supervise the EPC contractor
HSE Support	<ul style="list-style-type: none"> Ensure the generation of evidence and reports to ensure compliance with the recommended exposure limits as well as maintaining NEVLEC's KPIs Ensure the internal coordination to follow Management Plans
Social Specialist	<ul style="list-style-type: none"> Implement the Project's Grievance Mechanism Coordination of community meetings
EPC Contractor	<ul style="list-style-type: none"> Develop a project-specific Management Plans as needed to align with NEVLEC's requirements and St. Kitts and Nevis national legislation Develop and implement additional mitigation measures in the event of exceedances to the recommended limits or if proposed mitigation measures do not result in sufficient controls Ensure that workers have access to personal protective equipment (PPE) and are trained in appropriate use and jobs

Role	Responsibilities
Employees, Contractors and Subcontractors	<ul style="list-style-type: none"> Understand and carry out the activities set out in Management Plans

6.2 SUMMARY OF MANAGEMENT MEASURES

The Table 6.2 summarizes the Project’s ESMPs enlisting the measures applicable for the well N-4, for the purpose of this addendum. Please note that Objectives, Key Impacts, Mitigations, and Controls vary according to the specific Management Plans. Please refer to the 2022 Supplemental ESIA to consult the Project’s complete ESMP, including Key Performance Indicators (KPI) for each plan, and roles and responsibilities. Section 6.3 includes the estimated costs of the ESMP implementation. These costs were originally estimated in the 2022 ESIA and have been adjusted for inflation.

There are no new Management Programs for this addendum.

TABLE 6.2 SUMMARY OF ESMP APPLICABLE TO THE P&A ACTIVITIES OF WELL N-4

Name	Objective	Key Impacts Applicable to Well N-4	Mitigation Measures and Controls Applicable to the Well N-4
Air Emissions Management Plan	<p>Comply with applicable local and international air quality standards as listed in the IFC EHS General Guidelines (whichever is more stringent).</p> <p>Identify the potential sources of air impacts during P&A activities.</p> <p>Define P&A activity procedures for emissions management to eliminate, minimize and/or mitigate any air emissions ensuring they are controlled to acceptable levels; Align with international best practices.</p> <p>Define the procedures and mitigation measures to be applied to operation activities that have the potential to produce air emissions.</p> <p>Define training and communication commitments.</p> <p>Define the monitoring, reporting, and adaptive management procedures for the Plan.</p>	<p>Decrease in air quality due to the generation of dust and gaseous emissions from vehicles and P&A activities.</p> <p>Potential accumulation of H₂S.</p>	<p>The following are proper mitigation measures that can reduce the intensity and significance of the pollutants:</p> <ul style="list-style-type: none"> • Provide workers with educational materials, training, and PPE. • Vehicular movement should be restricted to a specific time for transportation and discarding of supplies and P&A activity materials. • Workers should wear dust masks and safety goggles, especially during dry and windy weather conditions to avoid health risk. • All vehicles, generators and other equipment used during the P&A activities will be properly tuned and maintained in good working condition to minimize emission of pollutants. • Emissions from the machinery and vehicles will be monitored on regular basis to ensure compliance of environmental standards. • Excessive engine idling will be discouraged and machinery causing excessive pollution (i.e. visible clouds of smoke) will be banned from sites. • Standby generators for power supply will be kept away from pathways and will be placed at locations where probabilities of human intervention are limited. • Watering unpaved roads/temporarily exposed bare soils. • Ensuring all trucks moving materials are covered. • Minimize earth movement activities. • Follow mechanical maintenance programs recommended by the manufacturers • The EPC contractor will install H₂S monitors and authorized workers that work in the N-4 cellar will have portable H₂S detectors. Only authorized workers will be allowed inside the cellar during P&A activities.
Noise Management Plan	<p>Comply with applicable local and international noise requirements.</p> <p>Identify the potential sources of noise impacts during Project operations.</p> <p>Define operation procedures for noise management.</p> <p>Align with international best practices.</p> <p>Define the procedures and mitigation measures to be applied to P&A activities and operation activities that have the potential to produce noise.</p> <p>Define training and communication commitments.</p> <p>Define the monitoring, reporting, and adaptive management procedures for the Plan.</p>	<p>Increased noise levels during P&A activities.</p>	<p>Noise Management Plan:</p> <ul style="list-style-type: none"> • Machinery operation and high noise activities should be carefully planned and scheduled. • P&A activities will cease between 22:00 and 07:00 hrs., night-time operations will only be considered for schedule reasons. • Vehicles and machinery will be equipped with silencers and will have up to date service checks to prevent them from creating excessive noise. • Occupational health, safety and environmental procedures and Environmental management plan for proposed project would be followed. • Monitoring should be conducted of noise levels during peak intervals (daily during construction and/or P&A activities).
Emergency Response Plan	<p>Prevent or control operational emergencies or possible industrial accidents that may arise during the operation phase of the Project.</p> <p>Establish procedures and plans to respond in a timely and efficient manner, and with the necessary resources, to fires, accidents, attacks and any other emergency that may arise.</p> <p>Prevent the consequences of a major event (fire, spills of dangerous products) from affecting human lives and property.</p> <p>Manage and maintain equipment and installations through periodic inspections.</p> <p>To provide a safe working environment, to determine the risks that could jeopardize the project and the personnel beforehand and to take all measures and be prepared for any possible emergency is adopted.</p>	<p>No specific impacts. This plan applies to any emergency during P&A activities.</p>	<p>Apply specific measures and procedures depending on the type of emergency: spills, fires or explosions, falls, cut wounds, electrocution, burns, attacks and sabotage.</p> <p>The Emergency Response Plan has provisions for drills and training, emergency contacts (internal and external), monitoring and reporting, and actions depending on the type and level of emergency (1,2 or 3).</p>
Security Management Plan	<p>Establish and define the guidelines that guarantee the protection and security of the assets and personnel involved in the execution of NEVLEC's projects and activities.</p>	<p>No specific impacts. This applies to security conditions In the Project area.</p>	<p>Fence the area to avoid trespassers from manipulating N-4 and nearby equipment.</p>

Name	Objective	Key Impacts Applicable to Well N-4	Mitigation Measures and Controls Applicable to the Well N-4
Workers Health and Safety Management Plan	<p>Align with international best practices, which could facilitate international lenders participations in Project financing.</p> <p>Protect the health and safety of all workers and employees of the Project.</p> <p>Be proactive in identifying risks and activities that may affect the health and safety of workers.</p> <p>Prevent accidents and incidents due to the activities of the Project.</p> <p>Define the roles and responsibilities for implementing this Plan.</p> <p>Define the monitoring, reporting, and intervention/adaptive management procedures for the Plan.</p>	<p>Potential injuries or fatalities for workers during P&A activities.</p>	<p>Risk identification, analysis and management.</p> <p>Preparation of work permits for high-risk activities:</p> <ul style="list-style-type: none"> • Work in confined space. • Heavy Machinery. • Lifting activities. • Use of Personal Protective Equipment (PPE). • Health and Safety Training. • Workers' Grievance Mechanism.
Labor Conditions and Workers Selection Plan	<p>Base the recruitment, selection and hiring of personnel on merit and competitiveness.</p> <p>Establish, maintain and improve worker-manager relationship.</p> <p>Promote fair treatment, non-discrimination and equal opportunity of workers, and compliance with healthy and safe (H&S) working conditions.</p> <p>Protect workers' wellbeing.</p>	<p>Gender impacts.</p> <p>The plan aims at assuring good working conditions for its workers and promoting equal opportunity during the recruitment process.</p>	<p>Developing and implementing a human resources policy which provide workers with information regarding their rights under the applicable labor law, including their rights related to wages and benefits.</p> <p>During the recruitment process, disclose to workers the terms of employment (schedule, compensation, benefits, etc.).</p> <p>NEVLEC will not make employment decisions based on personal characteristics unrelated to inherent job requirements.</p> <p>NEVLEC will not discourage workers to join worker's organizations and bargain collectively.</p> <p>NEVLEC has zero tolerance for acts of sexual exploitation, sexual abuse or sexual harassment.</p> <p>To mitigate gender impacts, NEVLEC will promote hiring women during P&A activities, women hired will have PPE that fits their size and will have flexible working hours if they are breastfeeding.</p> <p>NEVLEC will provide safe facilities and separate restrooms for women.</p> <p>NEVLEC will prohibit explicitly child and forced labor.</p>
Internal Grievance Mechanism	<p>Handle internal complaints, presented by its employees and internal stakeholders (e.g. direct workers and their organizations, workers hired by third parties, contractors, subcontractors, supply chain workers).</p>	<p>No specific impact. The internal GM has provisions so that workers can express their concerns and opinions without fear of retaliation or reprisal.</p>	<p>The internal GM process involves reception and registration, review, analysis and investigation, resolution, and evaluation and follow-up. There is a provision to appeal by the claimant. In addition, the GM is confidential and provides the possibility of submitting grievances anonymously.</p> <p>The full description of the internal GM can be found in section 8.13 of the 2022 Supplemental ESIA.</p>
External Grievance Mechanism	<p>Handle external complaints, presented by stakeholders outside the Project (e.g. affected communities, external stakeholders, interested groups, etc.).</p>	<p>No specific impact. The external GM has provisions so that affected communities, and other external stakeholders express their concerns and opinions without fear of retaliation or reprisal.</p>	<p>The GM process has the same steps as the internal GM, but it will be accessible to a different audience and publicized accordingly (press and media, NEVLEC's website, brochures and posters, stakeholder meetings).</p> <p>The full description of the external GM can be found in section 8.15 of the 2022 Supplemental ESIA.</p>
Community Health and Safety Plan	<p>Changes in the health of affected communities, including exposure to disease or changes in the availability and quality of water sources.</p> <p>Changes in livelihoods and income generation opportunities that affect the affected communities' access to social infrastructure.</p> <p>Changes in the security of the affected communities related to emergencies, unplanned events, crime and conflict.</p> <p>Ensure that the safeguarding of personnel and property is carried out in a legitimate manner that avoids or limits risks to the community's safety and security.</p>	<p>Road Safety, Traffic and road congestion.</p> <p>Exposure to dust and air emissions.</p>	<p>NEVLEC will communicate relevant health and safety information to communities about potential risks and impacts from the Project's activities.</p> <p>Additional measures:</p> <ul style="list-style-type: none"> • Notice of expected hours of operations • Notice of expected time of traffic interference • Notice of excess noise associated with project activities

Name	Objective	Key Impacts Applicable to Well N-4	Mitigation Measures and Controls Applicable to the Well N-4
Contractor Management Plan	Define the minimum requirements for contractors and subcontractors working on behalf of NEVLEC to minimize health, safety, environmental, and social (HSES) risks associated with the contracted services.	No specific impact. This plan will assure the EPC contractor applies E&S measures within NEVLEC's ESMS and ESMP for this Project.	Contractor management can be achieved through six steps: <ul style="list-style-type: none"> • Definition of the scope of work. • Pre-qualification of the contractor. • Contractor selection. • Contract award and terms establishment. • Contractor monitoring. • Post contract review. Each of the above will assure that the contractor undergoes a screening process to assure implementation of E&S measures and avoid, minimize and mitigate impacts. The full description of the Contractor Management Plan can be found on section 8.16 of the 2022 Supplemental ESIA.
Stakeholder Engagement Plan	<p>Promote the development of respectful and open relationships between stakeholders and NEVLEC.</p> <p>Identify stakeholders and understand their interests, concerns and influence in relation to ongoing activities.</p> <p>Provide stakeholders, both interested and affected stakeholders, with timely information about the Project's activities, in ways that are appropriate to their interests and needs.</p> <p>Guarantee the active participation and consultation of the stakeholders throughout the life of the Project. During the consultations there will not be any form of manipulation, interference, coercion or external intimidation.</p> <p>Support alignment with the international requirements, corporate standards and guidelines for stakeholder engagement.</p> <p>Record feedback and resolve any grievances that may arise through a formal feedback mechanism.</p> <p>Identify the resources and responsibilities for the SEP execution, including the monitoring activities.</p> <p>Monitor and evaluate the actions carried out to adapt or modify the SEP as necessary.</p>	Traffic, noise, H&S impacts (air quality, road safety) during P&A activities.	<p>The SEP is applicable to the Charlestown area (AID) and the entire Island of Nevis (AII). The process for engagement comprises the following steps:</p> <ul style="list-style-type: none"> • Stakeholder identification and mapping. • Identifying stakeholder groups. • Stakeholder Analysis. • Community Participation through Engagement and Public consultations. The latest consultation took place on November 17 and 18 2022 (see Appendix B, Consultation Report). • Disclosure of information (i.e., publication of ESIA's). • Implementation of the external GM; sensitization of the GM with the Contractor. <p>See the full SEP on Section 8.17 of the 2022 Supplemental ESIA. Once the awarded EPC is selected, additional consultation and stakeholder engagement will be performed prior to start of works.</p>
Water Management Plan	<p>Protect surface and groundwater quantity and quality for local users and the environment.</p> <p>Define management procedures for all water-related functions including roles and responsibilities and training requirements.</p> <p>Comply with applicable regulatory requirements and recommended international guidelines (i.e., WHO, IFC, NOAA).</p> <p>Align with international best practices; and define and implement monitoring and reporting procedures.</p>	<p>Potential contamination of surface or groundwater.</p> <p>Interruption or alteration to surface water patterns.</p>	<p>Implement a Soil erosion and Sediment Control and Drainage Control plan. Stormwater will be diverted from the P&A activities areas in accordance with the Erosion and Sediment Control Plan to avoid stormwater coming in contact with exposed soils or P&A activities equipment.</p> <p>Store all fuels, lubricants, and other hazardous materials used in P&A activities equipment in appropriate storage tanks and that will be in beamed areas within laydown area, have secondary containment for hazardous materials.</p> <p>Spill kits should be stored and available on site in the event of accidental spillage or leaks.</p> <p>Water monitoring via testing should be conducted for parameters such as turbidity etc.</p>

Name	Objective	Key Impacts Applicable to Well N-4	Mitigation Measures and Controls Applicable to the Well N-4
Transportation Management Plan	<p>Provide a safe environment for drivers, passengers, pedestrians, workers, communities and fauna of the Area of Influence.</p> <p>Establish guidelines regarding route planning and site access.</p> <p>Identify preventive measures to avoid and minimize traffic accidents and disturbances to nearby communities.</p> <p>Minimize road infrastructure degradation.</p> <p>Address transportation-related noise, vibration, and dust.</p> <p>Train transportation drivers on code of conduct and health and safety matters.</p> <p>Establish guidelines regarding route planning and site access.</p> <p>Identify preventive measures to avoid and minimize traffic accidents and disturbances to nearby communities.</p> <p>Minimize road infrastructure degradation.</p> <p>Address transportation-related noise, vibration, and dust.</p>	<p>Increased traffic from worker commuting and truck deliveries, resulting in potential for road congestion or delays during times of peak traffic volumes.</p> <p>Increased risk of vehicle collisions resulting in property damage, injury or mortality, including risk to pedestrians and bicyclists.</p> <p>Increased deterioration of road infrastructure.</p> <p>Dust and sediment transport from traffic leaving the Project site.</p> <p>Sensory disturbance resulting from the noise and vibration generated by vehicles.</p>	<p>Workers should be provided bussing opportunities to reduce congestion instead of driving their own vehicles.</p> <p>The backfilling activities should be scheduled, to the extent possible, to skipping peak hours to minimize the impact of barrier to the movement of people and traffic.</p> <p>All the gates of the schools/colleges are not blocked. Work should be carried out sequentially to allow access to some gates, while work is carried out in front of others.</p> <p>Prior notices shall be given to the legal shop owners and residents before the starting commissioning activities near these settings.</p> <p>Implementation of the Grievance Mechanism.</p> <p>Additional measures:</p> <ul style="list-style-type: none"> • Selecting alternate routes to divert traffic, mark temporary detours. • Traffic controllers (flaggers) signaling and controlling traffic in intersections or with higher pedestrian and vehicle transit. • Signage around the P&A activities area. • Enforce speed limits to Project vehicles. • Minimize truck deliveries during peak hours. • Minimize truck trips through efficient vehicle manifests. • Enforce a Journey Management Plan for truck deliveries. • For oversized vehicles, coordinate with local authorities, use escort vehicles, and provide advance notification to community. • Implement air quality control measures to prevent health impacts to community receptors. • Diversions, danger points and works at culverts, bridges and P&A activities sites will have appropriate warning signs; this is particularly important at night to avoid accidents. • Engage with communities to promote awareness of road safety issues and practices for drivers and pedestrians. • Provide information on scheduling and anticipated changes in traffic types and volumes due to Project P&A activities. • Implement driver safety programs, inspect vehicles to assure they are in good conditions.
Training Plan	<p>Provide a quick reference guide which compiles all the training requirements detailed throughout the individual Project's ESMP.</p> <p>To be aware of the legal framework.</p> <p>To become familiar with International Standards, such as the IFC Performance Standards, and any other standards pertaining to the Project.</p> <p>To know the relevant aspects of environmental and social management in all Project activities and promote their implementation.</p> <p>To train technical personnel in relation to threats, possible risk situations, to adopt strategies to reduce the effects on the different processes, communities and resources in the area of influence; including potential accidents associated with the P&A activities, operation and maintenance of the Project components.</p> <p>Train staff on environmental issues including the concept of non-hazardous and hazardous waste management including the implementation of the five (5) "Rs" (reuse, recycle, reduce, repair, reject) where appropriate, water conservation, and wildlife protection.</p> <p>Encourage an environmental culture in all Project workers, including staff sensitization on the importance of environmental sustainability.</p> <p>Train staff on social issues that include, for example, gender aspects, grievance mechanisms, workers' code of conduct, among others.</p> <p>Train staff on health and safety matters.</p>	<p>No specific impacts.</p>	<p>The training plan enlists required training and activities per topic; it covers all the Management Plans within the ESMP and the frequency of training. Please refer to Table 8-59 under section 8.21.3 of the 2022 Supplemental ESIA/ESMP to see the breakdown of required training.</p> <p>Key Performance Indicators involve having 100% of the trainings in the stipulated time frame for 100% of the workforce.</p>

Name	Objective	Key Impacts Applicable to Well N-4	Mitigation Measures and Controls Applicable to the Well N-4
Erosion and Sediment Control Plan	<p>Comply with the relevant country regulatory requirements;</p> <p>Avoid and control soil erosion and contamination;</p> <p>Follow best international practices guidelines;</p> <p>Define the procedures, integrated controls and mitigation measures to be used in construction activities and project operation phases that have the potential to cause adverse impacts;</p> <p>Define the roles and responsibilities for the implementation of this Plan;</p> <p>Define procedures for monitoring the efficiency of the mitigation measures, the generation of reports, interventions, and the adaptation of the plan.</p>	<p>Airborne dust</p> <p>Damage to native plants</p> <p>Pollution to local waterways and harm to aquatic animals within the local waterways</p> <p>Increase in flooding conditions.</p>	<p>All personnel will be trained on:</p> <ul style="list-style-type: none"> • General awareness and procedures concerning water management and the prevention of erosion and sedimentation; • General awareness on key indicators of erosion and sedimentation to apply corrective actions Disturbance area will be minimized and clearly demarcated. • The appropriate disposal methods of collected stormwater. <p>Additional measures:</p> <ul style="list-style-type: none"> • Works will only be conducted within the works zone. • Vehicle movements will be restricted to the defined roads/tracks. • Where possible, works area will be designed to ensure stormwater runoff drains into the site. • Where runoff from the site is required, it will be via the longest flow path possible to ensure maximum sediment retention. Flows to undisturbed areas will be prioritized. • Where required, sediment controls will be put in place. These will include, but not be limited to, sediment ditches, regulating dams such as rock check dams, sediment basins, sediment fences and silt socks. • Develop banks and excavation slopes in accordance with the guidelines for geotechnical stability. All soil stockpiles that will not be immediately re-used will be seeded. Temporary stockpiles will be watered as required to suppress dust. • Deposit surplus material in previously approved areas or reuse it as fill material. • Stabilization and progressive reforestation of affected areas with plants and vegetation native to the island.
Natural Disasters Management Plan	<p>Minimize or control damage from natural disasters to the project facilities;</p> <p>Establish procedures and response actions to respond to a natural disaster in a timely and efficient manner with the necessary resources;</p> <p>Prevent damage to human lives and the property of the company and third parties; and</p> <p>Maintain permanent control of equipment and facilities, through the performance of periodic inspections.</p>	<p>No specific impacts.</p>	<p>All personnel on site will receive training on procedures and actions to perform before, during, and after an emergency.</p> <p>After organizing the site's Emergency Brigade, they will be trained on the content of the Natural Disasters Management Plan and their responsibilities and duties in case of each type of emergency will be explained.</p> <p>In addition to the training, emergency response drills will also be conducted at least yearly. The drills will be conducted without notice and the response times will be monitored and recorded.</p> <p>The Emergency Response Plans will be reviewed and revised if improvements are needed after the drills. After the drill, trainings will be organized to resolve any faults encountered during the drills.</p> <p>Additional measures:</p> <ul style="list-style-type: none"> • Emergency response equipment (flashlights, water, etc.) • Audible alarms
Waste Management Plan	<p>Avoid and control the generation of waste related to the Project during the activities and controls and mitigation measures to be used during the activities that have the potential to affect the environment and the neighboring communities; and</p> <p>Comply with the requirements of the host country regarding the management and disposal of different types of waste.</p>	<p>Project activities waste, hazardous waste disposal.</p>	<ul style="list-style-type: none"> • Measures to prevent waste generation or to reduce them to the minimum; • Mechanisms for the collection, identification, temporary storage, and transportation of the waste before its transfer outside the Project areas; • Measures for the reuse of waste; • Options for recycling, treatment and disposal of waste, including the proposed final destinations of those that cannot be reused; • Procedures for registering and documentation of waste transfers; • Specific management measures for hazardous waste; • Regulatory requirements and classification; • Expected types and estimation of waste volumes; and • Trainings for staff awareness. • Provide appropriate waste bins, type, volume, and service frequency to accommodate anticipated waste streams. • All loads arriving or leaving the site will be appropriately secured. • Provide information regarding waste management in site-specific inductions, including waste separation and importance of securing vehicle loads. • Ensure licensed contractors are used to collect controlled wastes.

Name	Objective	Key Impacts Applicable to Well N-4	Mitigation Measures and Controls Applicable to the Well N-4
			<ul style="list-style-type: none">• Sewage generated must be discharged to the septic tanks; any other effluents generated (such as cement slurry, if any) will be discharged to the Long Point Landfill.

6.3 ESMP ESTIMATED COSTS

Table 6.3 provides a list of proposed and recommended management measures and a preliminary estimated cost for their implementation. Costs were originally estimated in the 2020 ESIA (which was later updated in 2022); the 2022 ESMP is applicable to all Project activities; not only P&A activities (i.e., the ESMP applies also to future drilling of production wells). Therefore, the table below does not separate the costs of P&A management measures. Rather, it includes the costs of implementing the ESMP. ERM has included the costs estimated in the original ESIA and has adjust them for inflation.

The preliminary estimated costs are indicative and will need to be reviewed before implementation and continually after, for accuracy. Some of the costs presented here will vary depending on the local market conditions and availability of the resources at the moment of implementation.

TABLE 6.3 ESMP ESTIMATED COSTS

Plan	Resource	Management Measure	Cost (USD)	Type	Preliminary Estimated Cost ¹⁰
All	Staff	Personnel per roles and responsibilities of ESMP			\$72.5-93k \$15.5-26k
Biodiversity Management Plan	Flora and Fauna	Pre-vegetation clearing surveys by a terrestrial plant and fauna specialists	Labor		\$3-5k
		Wildlife Specialist for Oversight and Animal rescue and relocation	Labor		\$2-4k
		Tree Fellers for vegetation removal	Labor		\$1-2k
		Revegetation	Labor and Supplies		\$3-5k
	Health and Safety	Training and signs	Labor and Supplies		\$2k
Air Emissions Management Plan	Air and Health and Safety	Air Emissions Monitoring - Includes Hydrogen Sulfide and n-pentane	Supplies		\$5-10k
		Dust control practices - soil wetting, seeding.	Supplies		\$1k
		Training and Inspections	Labor		\$2k
Noise Management Plan	Fauna and Health and Safety	Noise Monitoring	Supplies		\$3-6k
	Health and Safety	PPE	Supplies		\$2-4k
		Training	Labor		\$2k
Emergency Response Plan	Water, Soils, Health and Safety	Emergency response equipment - first aid/PPE, fire, spill response, security	Supplies		\$3-5k
	Health and Safety	Training	Labor		\$2k
Security Management Plan	Health and Safety	Training	Labor		\$2k
		Security Equipment - Cameras, fences, locks.	Supplies		\$3-4k
Workers Health and Safety Management Plan	Health and Safety	Training	Labor		\$2k
		PPE/Safety Equipment for personnel - for example: steel toe boots, hard hats, high visibility vests, earplugs, safety glasses	Supplies		\$4-6k
Labor Conditions and Workers Selection Plan	Socioeconomic, gender and social inclusion	Additional External Communications	Fees/Supplies		\$1-3k
		Training	Labor		\$2k
Internal and External Grievance Mechanism	Socioeconomic	Additional External Communications	Fees/Supplies		\$1-3k
		Training	Labor		\$2k
Community Health and Safety Plan	Health and Safety	Training	Labor		\$2k
		Additional External Communications	Fees/Supplies		\$1-3k
		Training (incl. Code of Conduct)	Labor		\$2k
Stakeholder Engagement Plan	Socioeconomic	Additional External Communications, Public Consultation, Disclosure of Information, Stakeholder Database	Fees/Supplies		\$2-4k
		Training	Labor		\$2k
Chance Find Plan	Cultural Heritage	Training	Labor		\$2k

¹⁰ Costs for the overall geothermal project from the 2022 ESIA addendum were adjusted for 2024 Nevis Consumer Price Index (CPI), (Statista, 2024). Additional costs incurred specifically to the P&A project are immaterial and included in the overall project cost.

Plan	Resource	Management Measure	Cost (USD)	Type	Preliminary Estimated Cost ¹⁰
Water Management Plan	Soil and Water	Monitoring – Sample analysis	Labor and Supplies		\$3-5k
		Wastewater storage and disposal	Supplies		\$1-5k
		Septic System maintenance	Labor and Supplies		\$1-2k
	Health and Safety	Potable water and storage	Supplies		\$5-10k
Transportation Management Plan	Health and Safety	Training	Labor		\$2k
		Vehicle Inspections	Labor and Supplies		\$1k
		Vehicle, Equipment and Road Maintenance (includes dust suppression, erosion control, etc.)	Labor and Supplies		\$5-8k
		Road Signs/PPE	Supplies		\$1k
		Additional External Communications, Grievance Mechanism	Fees/Supplies		\$1-3k
Erosion and Sediment Control Plan	Soil and Water	Monitoring – Sample analysis	Labor and Supplies		\$3-5k
		Erosion and Sediment Control Measures – Silt fences, berms, temporary storage, seeding, tarps	Labor and Supplies		\$5-10k
	Health and Safety	Training and Inspections	Labor		\$2k
Natural Disasters Management Plan	Health and Safety	Emergency response equipment (flashlights, water, etc.)	Supplies		\$1-2k
		Audible Alarms	Supplies		\$1k
		Training	Labor		\$2k
Well Blowout Prevention	Health and Safety	Training	Labor		\$2k
Waste Management Plan	Soil and Water	Material Storage	Supplies		\$1k
		Material Disposal Costs	Supplies		\$5-10K
		Monitoring – Sample analysis	Labor and Supplies		\$3-5k
	Health and Safety	PPE	Supplies		\$6-10k
		Training and Inspections	Labor		\$2k

7. CONCLUSIONS

The impacts from the P&A activities will only minimally add to those caused by the drilling of the five additional wells. The impacts main from the P&A activities that had a moderate significance before the application of mitigation measures are the following:

- Water quantity, required for P&A activities
- Water quality due to possible spills (e.g. oil from machinery) within the construction area
- Air quality due to the use of construction equipment
- Noise from the use of construction equipment
- Traffic, from the increase in the number of vehicles (construction trucks, drill rigs) in the area
- Waste generation during P&A activities

The main mitigation measures are as follows:

- For water quantity: Monitor water flow rate and usage to detect leaks and keep water usage within the estimated quantities; engage and coordinate with the water department to make sure NEVLEC's consumption is within the stipulated limits and not impede water for the Island
- For water quality: Fuels, lubricants, and other hazardous materials used in P&A activities equipment will be stored in appropriate storage tanks and that will be in beamed zones within laydown areas and have secondary containment for hazardous materials; minimize/eliminate having water accumulation to prevent vector-borne diseases.
- For air quality: Wetting techniques will be employed to minimize dispersion of particles; use of blower fans to be used in the well cellar if hydrogen sulfide is detected; workers will carry portable H₂S detectors; only authorized workers will be allowed in the cellar, where H₂S could potentially accumulate.
- For noise: Vehicles and machinery will be equipped with silencers and will be serviced to manufactures requirement to prevent excessive generation of noise; and prior notice will be given to stakeholders via Nevlec's website, radio and newspapers, regarding Project activities and schedule.
- For traffic: The activities should be scheduled, to the extent possible, skipping peak hours to minimize the impact of barrier to the movement of people and traffic; diversions, danger points and works at culverts, bridges and P&A activities sites will have appropriate warning signs; this is particularly important at night to avoid accidents; worker's sensitization and training on driving; trucks will not sit or stop on culvers or stormwater bridges.
- For waste management: The Waste Management Plan must be implemented to ensure that all liquid and solid hazardous and non-hazardous waste is treated and/or disposed of in accordance with national regulations and international guidelines.

After applying all the mitigation measures described in detail in Section 6.2, all the impacts are then reduced to minor or negligible significance.

ERM concludes that the proposed P&A of N-4 would result in environmental and social impacts that are minimal and of low significance after mitigation and management. The activities associated with the P&A of N-4 will just minimally contribute to the overall impact that will be caused by the drilling of five additional wells in Hamilton Estate. The Project will comply with requirements of the IDB Environment and Social (E&S) operating policies, IFC Performance Standards and CDBs Environmental and Social Review Procedures.



APPENDIX A

PHOTOLOG

SITE VISIT: AUGUST 7TH, 2024



Photo 1: Coconut Farm near the Project site
(the Project will not affect any structures within this farm).



Photo 2: Unpaved access road.



Photo 3: Project site area.



Photo 4: Carino Hamilton Development.



Photo 5: Proposed laydown area (Government owned).



Photo 6: Well N-4 and cellar.



Photo 7: Pressure gauge at N-4.



Photo 8: Well n-4.



Photo 9: Well pad area / N-4 barricaded.



Photo 10: Well pad area/ N-4 barricaded (ample view).



APPENDIX B N-3 IMPACT ASSESSMENT



APPENDIX C DRAFT REPAIR PLAN OF WELL N-4



APPENDIX D DRAFT HAZARD AND RISK ASSESSMENT
REPORT



APPENDIX E N-3 N-4 SITE OBSERVATION REPORT



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