4.0 Alternatives

4.1 Introduction

This chapter describes alternatives to the proposed Golden State Natural Resources Forest Resiliency Demonstration Project (project), consistent with California Environmental Quality Act (CEQA) Guidelines Section 15126.6. This chapter presents the objectives of the Proposed Project, a summary of its significant environmental impacts, and a description of the alternatives that were considered but eliminated from further consideration, followed by an analysis of the three alternatives evaluated, including the No Project Alternative. A comparison of the three alternatives to the Proposed Project is provided and the environmentally superior alternative is identified.

According to CEQA Guidelines Section 15126.6, an environmental impact report (EIR) shall describe a range of reasonable alternatives to the project or to the location of the project, that would feasibly attain most of the basic objectives of the project and could avoid or substantially lessen any of the significant effects of the project and evaluate the comparative merits of the alternatives. This section of the guidelines further requires that the discussion focus on alternatives capable of eliminating significant adverse impacts of the project or reducing them to a level of insignificance even if these alternatives would impede to some degree the attainment of the project objectives or would be more costly. The alternatives analysis also should identify any significant effects that may result from a given alternative.

The lead agency is responsible for selecting a reasonable range of potentially feasible project alternatives for examination and must publicly disclose its reasoning for selecting those alternatives. The range of alternatives is governed by a "rule of reason" that requires the EIR to set forth only those potentially feasible alternatives necessary to permit a reasoned choice. The alternatives shall be limited to those that would avoid or substantially lessen any of the significant effects of the project. Of those alternatives, the EIR need examine in detail only those that the lead agency determines could feasibly attain most of the basic objectives of the project while substantially lessening any of the significant effects of the project. An EIR need not consider every conceivable alternative to a project. Rather, it must consider a reasonable range of potentially feasible alternatives that will foster informed decision-making and public participation.

An EIR is not required to consider alternatives which are infeasible. "Feasible" means capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, legal, social, and technological factors (CEQA Guidelines Section 15364). Among the factors that may be taken into account when addressing the feasibility of alternatives are site suitability, economic viability, availability of infrastructure, general plan consistency, other plans or regulatory limitations, jurisdictional boundaries (projects with a regionally significant impact should consider the regional context), and whether the proponent can reasonably acquire, control, or otherwise have access to the alternative site (or already owns the alternative site). None of these factors establishes a fixed limit on the scope of reasonable alternatives. Under CEQA case law, the concept of feasibility also "encompasses 'desirability' to the extent that desirability is based on a reasonable balancing of the relevant economic, environmental, social, and technological factors." (*City of Del Mar v. City of San Diego* [1982] 133 Cal.App.3d 410, 417; *California Native Plant Society v. City of Santa Cruz* [2009] 177 Cal.App.4th 957.) In assessing the feasibility of alternatives, agency decisionmakers may also take account of the extent to which the alternatives meet or further the agency's underlying purpose or objectives in considering a proposed project. (*In re Bay-Delta Programmatic Environmental Impact Report Coordinated Proceedings* [2008] 43

Cal.4th 1143, 1165, 1166; *Sierra Club v. County of Napa* [2004] 121 Cal.App.4th 1490, 1506-1509; *Citizens for Open Government v. City of Lodi* [2012] 205 Cal.App.4th 296, 314-315.)

4.2 Project Objectives

The underlying purpose of the proposed project is to help restore forests, watersheds, and ecosystems to a more natural and resilient condition by sustainably procuring and processing excess biomass into a pelletized fuel source for renewable energy generation. The proposed project is designed to be consistent with the following objectives, established by GSFA in consultation with GSNR:

- Sustainably reduce excess fuel loads in high hazard landscapes at greatest risk of catastrophic wildfire.
- Reduce catastrophic wildfire risks associated with ladder fuels, crown fires, insect pathogens, and disease.
- Enhance ecological functions, watershed functions, wildlife habitat, biodiversity, and overall forest health and resilience by increasing tree spacing, reducing evapotranspiration water loss, reducing nutrient resource competition, improving the growth rates and health of larger and healthier tress, and increasing carbon sequestration and storage.
- Reduce environmental harms resulting from uncontrolled wildfires, including emissions of greenhouse gases and air pollutants.
- Facilitate opportunities to reintroduce traditional tribal and cultural forest management practices and prescribed burning to maintain healthy forest conditions.
- Reduce risk to first responders, residents, visitors, communities, and natural and manmade infrastructure from catastrophic wildfire.
- Reduce firefighting suppression costs, healthcare costs related to wildfire smoke, and impacts and losses to manmade infrastructure and communities.
- Protect California's high-value, iconic recreational resources, National and State Parks and other priceless natural resources from catastrophic wildfires.
- Offset the high costs of wildfire management activities by making productive use of low-value forest materials generated from those activities.
- Improve economic and community development and create jobs in historically overlooked and underinvested California communities.
- Support the development of new and emerging technologies that use biomass fuels to address climate change, such as Bioenergy with Carbon Capture and Storage (BECCS).

4.3 Overview of Significant Project Impacts

The range of alternatives studied in the EIR must be broad enough to permit a reasoned choice by decision-makers when considering the merits of the project. The analysis should focus on alternatives that are potentially feasible. Under CEQA, alternatives that are remote or speculative should not be discussed in the analysis of alternatives. Furthermore, alternatives should focus on reducing or avoiding significant environmental impacts associated with the project as proposed. As described in Chapter 3, the project would result in several potentially significant environmental impacts. These impacts include impacts to air quality, biological resources, cultural (archaeological) resources, geology, greenhouse gas (GHG) emissions, hazards, hydrology and water quality, transportation, utilities, and wildfire. With implementation of project development features and mitigation measures, impacts would be

reduced to less than significant with the exception of air quality, GHG emissions, and transportation (specifically, VMTs). Potentially significant impacts are identified in Table 4-1.

4.4 Alternatives Considered but Eliminated from Further Consideration

This section discusses alternatives that were considered but were eliminated from detailed consideration because they did not meet most of the basic project objectives; were found to be infeasible for technical, environmental, or social reasons; or they did not avoid or substantially lessen significant environmental impacts of the Proposed Project. Section 15126.6(c) of the CEQA Guidelines indicates that the range of potential alternatives shall include those that could feasibly accomplish most of the basic objectives of the project and could avoid or substantially lessen one or more of the significant effects. The EIR should briefly describe the rationale for selecting the alternatives to be discussed. The EIR should also identify any alternatives that were considered by the lead agency but were rejected as infeasible, and briefly explain the reasons underlying the lead agency's determination. Among the factors that may be used to eliminate alternatives from detailed consideration in an EIR are: (1) failure to meet most of the basic project objectives, (2) infeasibility (see introduction to this Chapter), or (3) inability to avoid significant environmental impacts.

4.4.1 Alternative Locations

As discussed in *Citizens of Goleta Valley v. Board of Supervisors* (1990) 52 Cal.3d 553 (*Goleta II*), where a project is consistent with an approved general plan, no off-site alternative need be analyzed in the EIR. The EIR "is not ordinarily an occasion for the reconsideration or overhaul of fundamental land-use policy." (Goleta II, supra, 52 Cal.3d at p. 573.) In approving a general plan, the local agency has already identified and analyzed suitable alternative sites for particular types of development and has selected a feasible land use plan. "Informed and enlightened regional planning does not demand a project EIR dedicated to defining alternative sites without regard to feasibility. Such ad hoc reconsideration of basic planning policy is not only unnecessary, but would be in contravention of the legislative goal of long-term, comprehensive planning." (*Goleta II, supra,* 52 Cal.3d at pp. 572-573. See also *Mira Mar Mobile Community v. City of Oceanside* (2004) 119 Cal. App. 4th 477, 491.)

The proposed sites for the Northern California and Central California pellet processing facilities and the Port of Stockton export facility are each consistent with the applicable General Plan and zoning. Further, the two processing facility sites have previously been used for the processing and/or shipment of wood products, and the export facility site is an infill location within a working port. For the reasons set forth above, CEQA does not require analysis of off-site alternatives under these circumstances. Nonetheless, this EIR includes such an analysis in the interests of public transparency and exceeding CEQA's requirements as an informational document and explains the justification for eliminating these alternatives from further consideration.

4.4.1.1 Considerations Applicable to All Project Sites

Per Section 15126.6(f)(2) of the CEQA Guidelines, when an EIR includes an analysis of alternative sites, "[t]he key question and first step in analysis is whether any of the significant effects of the project would be avoided or substantially lessened by putting the project in another location. Only locations that would avoid or substantially lessen any of the significant effects of the project need be considered for inclusion in the EIR."

As discussed above, the proposed project would result in significant and unavoidable impacts relating to air quality, GHG emissions, and VMTs. Each of these impacts is driven by the fundamental nature of project activities (i.e., removal of vegetative material from forested lands, transportation and processing into wood pellets, and further transportation, export, and use of wood pellets), rather than the specific locations of any facility site. Development of the processing or export facilities in an alternative location in the general vicinity of any of the proposed sites would result in comparable impacts at those locations, and would not avoid or substantially lessen any impact.

Furthermore, GSNR does not hold ownership control over any other adequately sized parcels of land in or near any facility site that could be used as an alternative location for the proposed project. Similarly, there are no existing properties for sale in the vicinity of any of the project sites that have the necessary characteristics for construction and operation of the proposed facilities (including size, access to both highway and rail infrastructure, minimizing greenfield development, and, for the export facility, access to marine shipping), and that could reasonably be controlled by GSNR for the purpose of developing the project. CEQA does not require sites that are not owned by the project proponent or that could not be reasonably acquired by the proponent to be considered as an alternative to the project. (CEQA Guidelines Section 15126.6(f)(1).) Therefore, because an alternative location is not available that would avoid or substantially lessen the significant environmental effects of the project, and because the GSNR does not have ownership control over, and cannot reasonably obtain ownership control over, any other parcels of land in the vicinity that could accommodate the proposed project facilities, an alternative location alternative is not required to be further analyzed. Accordingly, with the one exception below, this alternative is not further considered in the EIR.

4.4.1.2 Alternative Location: Northern California Site

Aside from the considerations noted above, certain environmental impacts related to the Northern California (Nubieber) site, notably flood zone impacts and jurisdictional waters, may be avoided by an alternative location. The proposed pellet facility site in Nubieber was selected after the consideration of alternative sites, including sites in Humboldt County, Lassen County, Modoc County, and Siskiyou County. The ability of these sites to meet the particular needs of this project was assessed based on a wide variety of criteria including (but not limited to) feedstock availability, wildfire mitigation benefits, logistical feasibility, transportation accessibility/availability, environmental and permitting feasibility, site/infrastructure constraints, potential site contamination concerns, workforce availability/community buy-in and readiness, and other miscellaneous constraints. The other noted locations were screened out for this project for the reasons cited below.

- "Big Valley Mill" - 554-925 Highway 299 East, Bieber, CA (Lassen County). Former sawmill and power plant located approximately three miles from the proposed Lassen Facility. Lacks rail access, and property has documented "recognized environmental conditions" (i.e., potential hazardous substances contamination).
- "Samoa" - 97 Bay Street, Samoa, CA (Humboldt County). Developed forest products facility located at the Port of Humboldt Bay. Lacks rail access, and site is small, with potential limitations on feedstock truck access/traffic. Potential ESHA (environmental sensitive habitat areas) for sand dune habitat. High potential for rare plants. Potentially significant archaeological and tribal cultural resources.
- "McCloud Millworks" - Siskiyou County APN 028-530-060 (Siskiyou County). Former mill site located in McCloud, California. Potentially greater impacts related to special status species, including rare plants. Potentially significant cultural resources (former Millworks building). McCloud Rail (shortline operator) not in operation. Shortline requires extensive upgrade to facilitate unit trains (263 track to 286). Due to steep grade, shorter trains required.

- "Modoc" - 615 Steam Road, Alturas, CA (Modoc County). Industrially-zoned property owned by public agencies located in Alturas, California. Potential height restrictions due to proximity to airport. Shortline rail has derailment history, and may require upgrades for long-term viability. Feedstock truck route goes directly through residential area, and site may not be accessible by truck for part of the year due to snow and ice.

4.5 Alternatives Selected for Analysis in the EIR

This section describes the alternatives to the project that were selected and analyzed according to CEQA Guidelines Section 15126.6(a). The analyzed alternatives represent a reasonable range of alternatives to the project that would feasibly attain most of the project's basic objectives and would avoid or substantially lessen the significant adverse environmental effects of the project. Two alternatives were analyzed for the production of different wood-based products, and one alternative assessed impacts associated with an alternative layout for the Northern California facility.

The following four alternatives, which are described in detail below, were selected for comparative analysis in this EIR:

1. No Project Alternative – The No Project Alternative are the circumstances under which the Proposed Project does not proceed.
2. Wood Product Alternative – This alternative involves producing an alternative wood product at the production facilities, as compared to wood pellets. Woody material would be harvested to produce either oriented strand board (OSB) or medium density fiberboard (MDF).
3. Biochar Alternative – This alternative involves producing biochar at the production facilities, as opposed to wood pellets. Biomass would still be harvested per the proposed project.
4. Northern California Site Alternative Layout – This alternatives would change the facility layout to maximize avoidance of jurisdictional waters (waters of the US and the State).

4.5.1 No Project Alternative

4.5.1.1 Description

CEQA Guidelines Section 15126.6(e) generally provides that "[t]he 'no project' analysis shall discuss the existing conditions at the time the notice of preparation is published, … as well as what would be reasonably expected to occur in the foreseeable future if the project were not approved, based on current plans and consistent with available infrastructure and community services." Section 15126.6(e)(3)(B) provides that, where, as here, a proposed project is something "other than a land use or regulatory plan," the "No Project" Alternative is "the circumstance under which the project does not proceed." The purpose of describing and analyzing a No Project Alternative is to allow decision-makers to compare the impacts of approving the Proposed Project with the impacts of not approving the Proposed Project (CEQA Guidelines Section 15126.6[e][1]). "[W]here failure to proceed with the project will not result in preservation of existing environmental conditions, the analysis should identify the practical result of the project's non-approval and not create and analyze a set of artificial assumptions that would be required to preserve the existing physical environment." (CEQA Guidelines Section 15126.6[e][3][B]).

Under the No Project Alternative, GSNR would not construct any facilities, nor engage in Sustainable Forest Management projects as described herein to promote forest resiliency and reduce the effects of catastrophic wildfire in California. The No Project Alternative would fail to meet any of the forest resiliency objectives as outlined in section 4.2.

Project construction, operations, and transportation impacts would be avoided. However, benefits accruing to reduction of catastrophic wildfire would not occur. While other local, state, and federal programs would continue to engage in vegetation management, the significant increase in this activity enabled by the GSNR project would not occur. Most estimates show increasing incidence, severity, and size of wildfires, particularly in the Sierra Nevada and Southern Cascades in the absence of increased management actions (CCST 2020). Catastrophic wildfire results in the release of carbon as a result of combustion, and may also slow the uptake in carbon sequestration that typically results from regrowth following a fire (Hemes 2023).

4.5.1.2 Impact Analysis

As shown in Table 4-1, the No Project Alternative would avoid many potentially significant impacts associated with construction, operations, and transportation for the proposed project. As shown in Table 4-1, impacts associated with construction and operation of the project would be avoided, including aesthetics (lighting), biological resources, cultural resources, geologic impacts, , hazards, hydrology, transportation, utilities, and wildfire. However, many of the benefits of the impacts avoided by the No Project alternative are offset by the reasonably foreseeable outcomes of wildfire, absent increased efforts to reduce the frequency and severity of wildfire. As discussed above, catastrophic wildfire has adverse carbon impacts. A comparison of treated vs. non-treated carbon loss data for a representative forest treatment sample is shown Section 3.7.2, Table 3.7-19. In addition, wildfire releases criteria air pollutants, such as particulate matter, which makes attainment of state air quality goals more difficult. The health effects of wildfire smoke can range from irritation to reduced lung function, bronchitis, exacerbation of asthma, and even increased risk of heart failure (CARB 2021). Smoke from wildfires has been linked to reductions in solar energy generation, a key component of California's renewable energy portfolio and central to the State's efforts to reduce GHG emissions from energy generation (Juliano 2022). While forests depend on natural cycles of fire, catastrophic wildfire can damage ecosystems. Areas subject to intense wildfire are also vulnerable to flooding and erosion (increasing impacts related to soils, hydrology, and water quality). While fire risk associated with the construction and operation of the project facilities (which is less than significant with implementation of feasible mitigation) would be avoided under the no project, the risk of wildfire itself would remain potentially significant.

4.5.1.3 Ability to Meet Project Objectives

The No Project Alternative would not meet any of the project objectives, including wildfire management objectives, biological and cultural resource objectives, and economic and community development objectives.

4.5.2 Wood Product Alternative

4.5.2.1 Description

Under this alternative, woody material would be harvested to produce either oriented strand board (OSB) or medium density fiberboard (MDF), instead of wood pellets. The rationale behind this alternative is to preserve carbon from forest vegetation in the final product, as opposed to a fuel use.

OSB is an engineered wood that is formed by adding adhesives and compressing layers of wood strand. It is often used in residential and commercial construction due to its ability to resist deflection, delamination, and warping, making it an ideal material for load bearing uses such as flooring (APA – The Engineered Wood Association 2024). Similar to the proposed project, the primary source of GHG emissions in OSB production is the drying process, which requires thermal energy production (Puettmann, Karstmer, and Taylor 2016). OSB strands, which are compressed into OSB sheets, are produced by thinly slicing logs (typically 8 to 12 inches in diameter) into wood flakes that are approximately 0.5 in by 3 inches by 0.02 inch, depending on process and material ((Fisette 2005; Hiziroglu 2017). Currently, OSB waste can only be incinerated; there are no alternatives for disposal (The Upstyle Wood Guide.org, n.d.)

MDF is a different engineered wood product that is often used in furniture and interior construction (such as cabinets, countertops, and trim). Its smooths surface and uniform density make it ideal for shaping (Travis Perkins 2024). As with OSB, MDF is produced using adhesives, including synthetic resin binder and wax (Government of Canada 2024). However, while OSB is made by compressing wood strands that are a few inches in length, MDF is made by adhering fine wood fibers together, from hard or softwood (Travis Perkins 2024). Recycling options for MDF are still being investigated, as most MDF waste is currently landfilled (Zimmer and Bachmann 2023). Studies indicate during decomposition, OSB and MDF offgas toxic compounds, originating from formaldehyde, urethane, and/or melamine used in their production.

4.5.2.2 Impact Analysis

As shown in Table 4-1, the impacts from forest operations, transportation, and the construction and operation of the production facilities would be similar to the proposed project. By retaining some carbon within the OSB or MDF wood product, overall GHG emissions may be reduced (although likely not to a less than significant level).

Additionally, a higher percentage of OSB and MDF are used domestically. Thus, emissions from overseas shipping may be reduced, but this would be partially offset by truck and rail transport within the United States. Furthermore, OSB and MDF both use resin in the production process. Wood pellets do not require adhesives, as pellets rely on lignin in wood to hold shape (Jones, Haper, and Taylor 2023) . Adding resin to wood products incurs additional emissions associated with resin production, transport, and use. Finally, the production of both OSB and MDF may result in the generation of toxicants including formaldehyde, urethane, and melamine, which could create additional air quality impacts (Zimmer and Bachmann 2023). By eliminating the need to store pellets, impacts associated with facility fire may decrease, but new impacts would be created through the storage and transport of toxicants for MDF and OSB production.

GHG emissions from final use of the product (fuel pellets) would be reduced. However, GHG emission associated with the other aspects of the project, including feedstock acquisition, production, and transportation, would not be reduced, resulting in a reduced, but still potentially significant impact. Similarly, criteria air pollutants from combustion of the fuel pellets would be reduced, but other aspects of the project emissions, including feedstock acquisition, facility construction, operation, and transportation, would not be substantially reduced. Furthermore, emissions of toxic air pollutants would be increased due to the use of adhesives to produce OSB and MDF – as compared to wood pellets which are produced from heat and pressure rather than chemical additives.

In terms of biological resources and forestry, note that the production of OSB requires larger diameter feedstock material, and unlike wood pellets, does not provide an outlet for smaller diameter materials such as slash, and thus, cannot achieve same fuel reduction benefits as wood pellets. OSB strands, which are compressed to create OSB boards, are produced by “stranding”, or thinly slicing, logs into wood flakes (Fisette 2005). Conversely, wood

pellets can be produced from a wide variety of woody materials besides logs, as wood is finely chipped before it is compacted into pellets (Laschi, Marchi, and González-García 2016). The production of wood pellets does not necessitate intact strands of wood and thus, allows for a wider variety of woody material to be harvested and transformed into wood products. The flexible woody biomass requirements characteristic of wood pellets better helps the State to achieve its wildfire mitigation objectives and waste reduction targets through this product. When wood waste is routed to the State's landfills, it produces methane, a potent greenhouse gas, which counteracts the State's GHG reduction efforts. SB 1383, passed by the State legislature in 2016, requires that CalRecycle develop regulations to reduce 75% of organic waste sent to landfills, which will require 20 million tons of organic materials to be re-routed away from landfills (Johnson, 2017)). The production of wood pellets provides a superior opportunity for woody waste to be repurposed and sold to produce renewable energy. Production of OSB and MDF would require similar energy inputs (for feedstock acquisition, manufacturing, and transportation), but would have no offsetting energy benefits. Furthermore, slash produced by the logging industry is estimated as the top source of annual BDT in California, and thus, repurposing this type of woody biomass is essential for reducing wildfire fuel loads (Go-BIZ and OPR 2022). OSB cannot be produced from slash and thus, this alternative does not fully achieve the project's wildfire mitigation objectives.

4.5.2.3 Ability to Meet Project Objectives

The wood materials alternative would achieve many of the proposed project objectives. However, softer market demand for these products is likely to limit the ability for the project to sustain treatment activities. Studies indicate that the OSB market has remained stagnant since 2018, which may jeopardize the project's ability to achieve its wildfire fuel reduction goals in practice, and reach its objective of providing economic benefits to historically overlooked and underinvested California communities. Researchers have emphasized the need for further investigation regarding how the production of structural wood products aligns with California's forest management goals (Sanchez et al. 2020).

OSB, and to a lesser extent MDF, are further limited by the size and type of feedstock that can be used in the manufacturing process, thereby reducing the extent to which they can achieve project objectives. Small diameter materials, such as forest slash, are generally not used for these products, and would likely either be left to decompose in place or be burned. Transport of unused material to a composting facility is likely not feasible due to the limited number of such facilities in the Working Area and the long travel distances involved. For these reasons, this alternative likely does not achieve the same degree of wildfire management objectives as the proposed project.

4.5.3 Biochar Alternative

4.5.3.1 Description

Under this alternative, the GSNR facility would produce biochar instead of wood pellets. Biochar is a charcoal-like substance that is made by pyrolysis, a controlled process of heating organic material from agricultural and forestry wastes (also called biomass) in a low-oxygen environment. Biochar is applied to agricultural soils using a variety of application rates and preparation techniques. Biochar production is a carbon-negative process, which means that it actually reduces CO_2 in the atmosphere. In the process of making biochar, the unstable carbon in decaying plant material is converted into a stable form of carbon that is then stored in the biochar. The release of heat energy from this process can be also captured and used to create steam which is used to generate electricity (Spears 2018, Levitan 2010).

Biochar technology has not been employed, either domestically or internationally, at the scale to accomplish the treatment goals of the proposed project – raising critical issues of feasibility. Currently, there are only approximately 150 companies in the United States, mostly small suppliers, selling biochar worldwide (Thengane et al. 2021). These producers generally work at a scale of hundreds or thousands of metric tons per year (Trellis 2024). This scale would not be sufficient to meet the project objectives for fuel reduction, as the project would need to produce hundreds of thousands of metric tons of biochar to achieve stated objectives (the proposed project would produce up to 1,000,000 metric tons of product). The small market size makes it challenging to assess the overall feasibility of this alternative.

4.5.3.2 Impact Analysis

A higher amount of carbon would be sequestered in the project, as compared to the proposed project, due to the uptake of CO_2 by biochar. This would reduce the impact related to GHG emissions, as shown in Table 4-1. GHG emissions from final use of the product (fuel pellets) under the proposed project would be avoided. However, to achieve the basic objectives of the project, the biomass to produce biochar would be obtained through sustainable forest management projects. GHG emissions would therefore be reduced, but not necessarily to a less-than-significant level, due to emissions related to obtaining and transporting feedstock, and transporting the product to market. Air quality impacts may be reduced, as the end product is not used in energy production, but again, not to a less-than-significant level due to transportation emissions. Environmental impacts related to facility construction, feedstock acquisition, production operations, and transportation would remain largely the same.

Biochar is largely an underdeveloped commodity, and thus, there are many outstanding questions surrounding environmental impacts associated with biochar application. Additional R&D is needed to fully understand the potential positive and negative attributes associated with this alternative (Thengane et al. 2021). Additionally, studies indicated that biochar may increase the likelihood of excessive soil salinity and decreased soil fertility because of an increase in the pH of alkaline soils causing nutrient precipitation. Adverse impacts on reproduction, growth, and DNA integrity of earthworms have been reported along with effects on soil microbiome such as a shift in the fungi-to-bacteria ratio (Brtnicky et al. 2021). These impacts must be further evaluated before biochar is produced at the scale required to achieve project objectives.

Expansion of the biochar market would necessitate changes in the viewpoints of policymakers and consumers. Upstream and downstream costs will have direct impacts on the overall success of biochar as a product. The development of carbon credits could help bring the biochar market out of its infancy; however, to be successful, this would require a multitude of policies/regulations to develop and guide the market (Thengane et al. 2021)

4.5.3.3 Ability to Meet Project Objectives

The biochar alternative would achieve many of the proposed project objectives to some extent; however, there is far too much uncertainty surrounding its use and production to qualify as feasible alternative. It is unclear if this alternative could feasibly achieve the same scale as the proposed project, as there are numerous technological barriers associated with biochar production, application, and forest management practices. As articulated, many knowledge gaps exist surrounding the efficacy of biochar under various environmental conditions, methodologies for assessing wood biomass volume, and best practices for handling, preparing, transporting, and storing biochar. This alternative would also require the development of novel, specialized equipment and staff trainings (Peirson et al. 2024). Due to the underdeveloped nature of the biochar market, it is unclear if this alternative would achieve economic self-sufficiency, necessary to sustain forest resiliency activities. Domestic and international demand for

biochar remains unclear, with limited production and high costs. Today, approximately 150 companies (mostly small garden supply and specialties realtors) sell biochar worldwide, illustrating that the market is still in its infancy, and economic outlook remains uncertain (Thengane et al. 2021). Thus, this alternative may not achieve long-lasting community benefits in historically overlooked and underinvested California communities, nor achieve the same amount of wildfire fuel reduction treatment as the proposed project.

4.5.4 Alternative Layout at Northern California Facility

4.5.4.1 Description

This alternative presents a maximum avoidance design for on-site jurisdictional waters, including wetlands. This design would reduce, but not entirely avoid impacts to waters of the US and waters of the state. However, this alternative layout creates serious operational challenges, including a lengthy conveyance of feedstock from the woodyard to the production facility, which would increase costs and decrease reliability (by creating additional maintenance challenges). This alternative site layout is shown in Figure 4-1.

4.5.4.2 Impact Analysis

As shown in Table 4-1, the alternative layout decreases impacts to on-site jurisdictional waters, but not to a less-than-significant level without mitigation measures similar to those necessary for the proposed project.. No other impacts would be substantially reduced or avoided.

4.5.4.3 Ability to Meet Project Objectives

While this alternative would accomplish most of the key objectives, reduced efficiency at the plant may impair the project's ability to offset wildfire fuel management costs by making productive use of low-value forest materials, thereby jeopardizing achievement of the project's forest resiliency treatment objectives.

4.6 Impact Comparison

Table 4-1 shows the potentially significant impacts of the proposed project, and the potential impacts of each alternative. Where an alternative would result in a potentially significant impact that would not occur under the proposed project, that is also noted in the table.

Table 4-1. Comparison of Alternatives

Project Impact (Prior to Implementation of Mitigation Measures)	Project	No Project	Wood Product Alt.	Biochar Alt.	Alternative Layout at Northern California Facility
Aesthetics					
AES-1. The project would not have a substantial adverse effect on a scenic vista.	LTS	LTS	LTS	LTS	LTS
AES-2. The project would not substantially damage scenic resources, including, but not limited to, trees, rock outcroppings, and historic buildings within a state scenic highway.	LTS	LTS	LTS	LTS	LTS
AES-3. In nonurbanized areas, the project would not substantially degrade the existing visual character or quality of public views of the site and its surroundings. In an urbanized area, the project would not conflict with applicable zoning and other regulations governing scenic quality.	LTS	LTS-	LTS	LTS	LTS
AES-4. The project would not create a new source of substantial light or glare which would adversely affect day or nighttime views in the area.	PS	LTS-	PS	PS	PS
Air Quality					
AIR-1. The project would potentially conflict with or obstruct implementation of the applicable air quality plan.	PS	PS	PS	PS	PS
AIR-2. The project would potentially result in a cumulatively considerable net increase of any criteria pollutant for which the project region is non-attainment under an applicable federal or state ambient air quality standard.	PS	PS	PS	PS	PS
AIR-3. The project may expose sensitive receptors to substantial pollutant concentrations.	PS	PS	PS	PS	PS

Table 4-1. Comparison of Alternatives

Project Impact (Prior to Implementation of Mitigation Measures)	Project	No Project	Wood Product Alt.	Biochar Alt.	Alternative Layout at Northern California Facility
AIR-4. The project would not result in other emissions (such as those leading to odors) adversely affecting a substantial number of people.	LTS	LTS	LTS	LTS	LTS
Biological Resources					
BIO-1. The proposed project would have no impact on special-status plants but could have a substantial adverse effect on some special-status wildlife species during construction.	PS	LTS	PS	PS	PS
BIO-2. The proposed project could have a substantial adverse effect on riparian habitat or sensitive natural communities.	PS	LTS	PS	PS	PS
BIO-3. The proposed project could have a substantial adverse effect on state or federally protected wetlands or waters.	PS	LTS	PS	PS	PS-
BIO-4. The proposed project could impede the use of native wildlife nursery sites by removing or causing abandonment of active native bird nests.	PS	LTS	PS	PS	PS
BIO-5. The proposed project could conflict with local policies or ordinances protecting oak trees.	LTS	LTS	LTS	LTS	LTS
Cultural and Tribal Cultural Resources					
CUL-1. The project would not cause a substantial adverse change in the significance of a historical resource pursuant to §15064.5.	LTS	LTS	LTS	LTS	LTS
CUL-2. The project may cause a substantial adverse change in the significance of an archaeological resource pursuant to §15064.5 or disturb human remains.	PS	LTS-	PS	PS	PS

Table 4-1. Comparison of Alternatives

Project Impact (Prior to Implementation of Mitigation Measures)	Project	No Project	Wood Product Alt.	Biochar Alt.	Alternative Layout at Northern California Facility
CUL-3. The project may cause a substantial adverse change in the significance of a tribal cultural resource, defined in Public Resources Code section 21074.	PS	LTS-	PS	PS	PS
Energy					
ENE-1. The project would not result in wasteful, inefficient, or unnecessary consumption of energy resources.	LTS	LTS	LTS	LTS	LTS
ENE-2. The project would not conflict with or obstruct a state or local plan for renewable energy or energy efficiency.	LTS	LTS+	LTS	LTS	LTS
Geology and Soils					
GEO-1a. The project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving rupture of a known earthquake fault, as delineated on the most recent Alquist-Priolo Earthquake Fault Zoning Map, issued by the State Geologist for the area or based on other substantial evidence of a known fault.	LTS	LTS	LTS	LTS	LTS
GEO-1b. The project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving strong seismic ground shaking.	LTS	LTS	LTS	LTS	LTS
GEO-1c. The project would not directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving seismically related ground failure, including liquefaction.	LTS	LTS	LTS	LTS	LTS

Table 4-1. Comparison of Alternatives

Project Impact (Prior to Implementation of Mitigation Measures)	Project	No Project	Wood Product Alt.	Biochar Alt.	Alternative Layout at Northern California Facility
GEO-1d. The project would potentially directly or indirectly cause potential substantial adverse effects, including the risk of loss, injury, or death involving landslides.	PS	LTS-	PS	PS	PS
GEO-2. The project would potentially result in substantial soil erosion or the loss of topsoil.	PS	LTS-	PS	PS	PS
GEO-3. The project would not be located on a geologic unit or soil that is unstable, or that would become unstable as a result of the project, and potentially result in on- or off-site landslide, lateral spreading, subsidence, liquefaction or collapse.	PS	LTS-	PS	PS	PS
GEO-4. The project would not be located on expansive soil, creating substantial direct or indirect risks to life or property.	LTS	LTS	LTS	LTS	LTS
GEO-5. The project would potentially have soils incapable of adequately supporting the use of septic tanks or alternative wastewater disposal systems where sewers are not available for the disposal of wastewater.	PS	LTS-	PS	PS	PS
GEO-6. The project would potentially directly or indirectly destroy a unique paleontological resource or site or unique geologic feature.	PS	LTS-	PS	PS	PS
Greenhouse Gas Emissions					
GHG-1. The project would potentially generate GHG emissions, either directly or indirectly, that may have a significant impact on the environment.	PS	PS-	PS-	PS-	PS
GHG-2. The project would potentially conflict with an applicable plan, policy or regulation adopted for the purpose of reducing the emissions of greenhouse gases.	PS	PS-	PS-	PS-	PS

Table 4-1. Comparison of Alternatives

Project Impact (Prior to Implementation of Mitigation Measures)	Project	No Project	Wood Product Alt.	Biochar Alt.	Alternative Layout at Northern California Facility
Hazards and Hazardous Materials					
HAZ-1. The project would not create a significant hazard to the public or the environment through the routine transport, use, or disposal of hazardous materials.	LTS	LTS-	LTS	LTS	LTS
HAZ-2. The project would not create a significant hazard to the public or the environment through reasonably foreseeable upset and accident conditions involving the release of hazardous materials into the environment.	LTS	LTS-	LTS	LTS	LTS
HAZ-3. The project would not emit hazardous emissions or handle hazardous or acutely hazardous materials, substances, or waste within one-quarter mile of an existing or proposed school.	LTS	LTS	LTS	LTS	LTS
HAZ-4. The project could create a significant hazard to the public or the environment due to being located on a site which is included on a list of hazardous materials sites compiled pursuant to Government Code § 65962.5.	PS	LTS-	PS	PS	PS
HAZ-5. The project would not impair implementation of or physically interfere with an adopted emergency response plan or emergency evacuation plan.	LTS	LTS	LTS	LTS	LTS
HAZ-6. The project would not expose people or structures, either directly or indirectly, to a significant risk of loss, injury or death involving fires.	PS	LTS-	PS	PS	PS

Table 4-1. Comparison of Alternatives

Project Impact (Prior to Implementation of Mitigation Measures)	Project	No Project	Wood Product Alt.	Biochar Alt.	Alternative Layout at Northern California Facility
Hydrology and Water Quality					
HYD-1. The project would potentially violate water quality standards or waste discharge requirements or otherwise substantially degrade surface or ground water quality.	PS	LTS-	PS	PS	PS
HYD-2. The project would not substantially decrease groundwater supplies or interfere substantially with groundwater recharge such that the project may impede sustainable groundwater management of the basin.	PS	LTS-	PS	PS	PS
HYD-3. The project would potentially alter the existing drainage pattern of the site or area, including through the alteration of the course of a stream or river or through the addition of impervious surfaces, in a manner which would:					
i. result in substantial erosion or siltation on or off site;	PS	LTS-	PS	PS	PS
ii. substantially increase the rate or amount of surface runoff in a manner which would result in flooding on or off site;	PS	LTS-	PS	PS	PS
iii. create or contribute runoff water which would exceed the capacity of existing or planned stormwater drainage systems or provide substantial additional sources of polluted runoff; or	PS	LTS-	PS	PS	PS
iv. cause the proposed development, when combined with all other existing and anticipated development, to increase the water surface elevation of the base flood more than one foot at any point within the community.	LTS	LTS-	PS	PS	PS
HYD-4. The project would not risk release of pollutants due to project inundation in a flood hazard, tsunami, or seiche zone.	LTS	LTS	LTS	LTS	LTS

Table 4-1. Comparison of Alternatives

Project Impact (Prior to Implementation of Mitigation Measures)	Project	No Project	Wood Product Alt.	Biochar Alt.	Alternative Layout at Northern California Facility
HYD-5 The project would not conflict with or obstruct implementation of a water quality control plan or sustainable groundwater management plan.	LTS	LTS-	LTS	LTS	LTS
Land Use and Planning					
LU-1. The project would not conflict with any applicable land use plan, policy, or regulation adopted for the purpose of avoiding or mitigating an environmental effect.	LTS	LTS	LTS	LTS	LTS
Noise					
NOI-1. The project would not result in generation of a substantial temporary or permanent increase in ambient noise levels in the vicinity of the project in excess of standards established in the local general plan or noise ordinance, or applicable standards of other agencies.	LTS	LTS-	LTS	LTS	LTS
NOI-2. The project would not result in generation of excessive groundborne vibration or groundborne noise levels.	LTS	LTS	LTS	LTS	LTS
NOI-3. The project is not one that is located within the vicinity of a private airstrip or an airport land use plan or, where such a plan has not been adopted, within two miles of a public airport or public use airport, that would expose people residing or working in the project area to excessive noise levels.	LTS	LTS	LTS	LTS	LTS
Population and Housing					
POP-1. The project would not induce substantial unplanned population growth in the area, either directly or indirectly.	LTS	LTS-	LTS	LTS	LTS

Table 4-1. Comparison of Alternatives

Project Impact (Prior to Implementation of Mitigation Measures)	Project	No Project	Wood Product Alt.	Biochar Alt.	Alternative Layout at Northern California Facility
POP-2. The project would not displace substantial numbers of existing people or housing, necessitating the construction of replacement housing elsewhere.	NI	NI	NI	NI	NI
Public Services					
SER-1. The project would not result in substantial adverse physical impacts associated with the provision of new or physically altered governmental facilities, or the need for new or physically altered governmental facilities, the construction of which could cause significant environmental impacts, in order to maintain acceptable service ratios, response times, or other performance objectives for any of the public services.					
Fire Protection	LTS	LTS	LTS	LTS	LTS
Police Protection	LTS	LTS	LTS	LTS	LTS
Schools	LTS	LTS	LTS	LTS	LTS
Parks	LTS	LTS	LTS	LTS	LTS
Library Facilities	LTS	LTS	LTS	LTS	LTS
Transportation					
TRF-1. The project may conflict with a program, plan, ordinance, or policy addressing the circulation system, including transit, roadway, bicycle, and pedestrian facilities.	PS	LTS-	PS	PS	PS
TRF-2. The project would be inconsistent with CEQA Guidelines Section 15064.3, subdivision (b).	PS	LTS-	PS	PS	PS
TRF-3. The project could substantially increase hazards due to a geometric design feature (e.g., sharp curves or dangerous intersections) or incompatible uses (e.g., farm equipment).	PS	LTS-	PS	PS	PS
TRF-4. The project would not result in inadequate emergency access.	LTS	LTS	LTS	LTS	LTS

Table 4-1. Comparison of Alternatives

Project Impact (Prior to Implementation of Mitigation Measures)	Project	No Project	Wood Product Alt.	Biochar Alt.	Alternative Layout at Northern California Facility
Utilities and Service Systems					
UTIL-1. The project would require the relocation or construction of new or expanded water, wastewater treatment, storm water drainage, electric power, natural gas, or telecommunications facilities resulting in environmental effects.	PS	LTS-	PS	PS	PS
UTIL-2. The project would have sufficient water supplies available to serve the project and reasonably foreseeable future development during normal, dry and multiple dry years.	LTS	LTS-	LTS	LTS	LTS
UTIL-3. The project would not result in a determination by the wastewater treatment provider, that it does not have adequate capacity to serve the project's projected demand in addition to existing commitments.	LTS	LTS-	LTS	LTS	LTS
UTIL-4. The project would not generate solid waste in excess of state or local standards, or in excess of the capacity of local infrastructure, or otherwise impair the attainment of solid waste reduction goals. The project would comply with all federal, state, and local management and reduction statutes and regulations related to solid waste.	LTS	LTS-	LTS	LTS	LTS
Wildfire					
WIL-1. The project would not substantially impair an adopted emergency response plan or emergency evacuation plan.	LTS	LTS	LTS	LTS	LTS

Table 4-1. Comparison of Alternatives

Project Impact (Prior to Implementation of Mitigation Measures)	Project	No Project	Wood Product Alt.	Biochar Alt.	Alternative Layout at Northern California Facility
WIL-2. The project would potentially exacerbate wildfire risks due to slope, prevailing winds, and other factors, and thereby expose project occupants to pollutant concentrations from a wildfire or the uncontrolled spread of a wildfire.	PS	PS	PS	PS	PS
WIL-3. The project would potentially require the installation or maintenance of associated infrastructure (such as roads, fuel breaks, emergency water sources, power lines or other utilities) that may exacerbate fire risk or that may result in temporary or ongoing impacts to the environment.	PS	LTS-	PS	PS	PS
WIL-4. The Project would potentially expose people or structures to significant risks, including downslope or downstream flooding or landslides, as a result of runoff, post-fire slope instability, or drainage changes.	PS	PS	PS	PS	PS

LTS = Less Than Significant
PS = Potentially Significant
- Impact would be reduced
+ Impact would be greater

4.7 Environmentally Superior Alternative

CEQA Guidelines require that an EIR identify the environmental superior alternative (Section 15126.6 (e)(2)). If the environmentally superior alternative is the "No Project" Alternative, the EIR must identify an environmentally superior alternative from among the other alternatives.

The No Project Alternative would avoid most of significant project impacts, but would fail to achieve any of the project objectives. Therefore, one of the "build" alternatives should be identified as the environmentally superior alternative.

The Biochar alternative would reduce GHG emissions, by increasing sequestration in the final product. This alternative may not reduce impacts to less than significant due to the GHG impacts associated with obtaining and transporting feedstock. Unlike the Alternative Wood Product, it would not require additional chemicals to produce or substantially limit the type (size) of feedstock used. However, there are potential impacts to soils from overuse of biochar as an amendment. On balance, the Biochar alternative would be considered the environmentally superior alternative.

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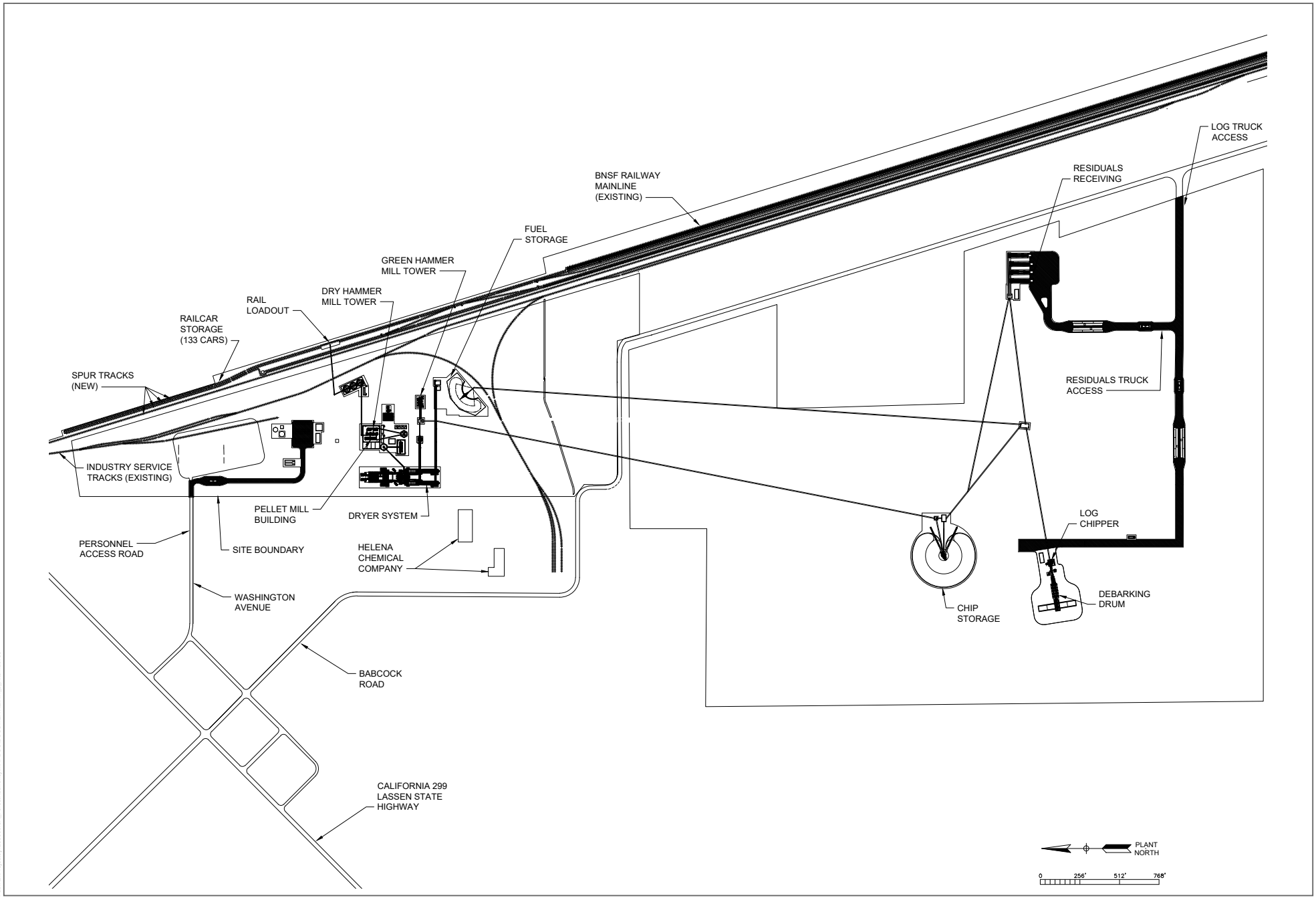

SOURCE: Nexus 2023

FIGURE 4-1

Northern California Site Alternative Layout

Golden State Natural Resources Forest Resiliency Demonstration Project

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