SCIENCE INTEGRITY KNOWLEDGE

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FINAL

HEALTH IMPACT ASSESSMENT
E&B OIL DRILLING AND PRODUCTION PROJECT

September 3, 2014

Prepared at the request of:

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EXECUTIVE SUMMARY

Health Impact Assessment
E&B Oil Drilling and Production Project
September 2014

This summary presents the findings of the Health Impact Assessment (HIA) completed to inform voters about the potential health impacts of E&B's proposed oil drilling and production project (the Project) in the City of Hermosa Beach, CA. The City commissioned this HIA in addition to a Cost-Benefit Analysis (CBA) and an Environmental Impact Report (EIR). The HIA complements the EIR and CBA, providing additional consideration of potential impacts (negative and positive) on community health from the proposed Project. This Final HIA is the result of a comprehensive process that included public meetings and input on draft documents from community members, a peer reviewer, the City and its other consultants, E&B, and community organizations. We would like to thank the community for taking the time to provide comments throughout the process. This input was essential to the completion of the HIA.

The HIA was based on best practices and included the following steps: screening, scoping, assessment, recommendation, reporting, evaluation, and monitoring. The scoping step identified six major categories (including 18 individual health determinants) based on stakeholder input and other factors: air quality; water and soil; upset scenarios; noise and light; traffic; and community livability. During the assessment step, we completed a baseline health profile as a reference point and then predicted what Project-related (with EIR mitigation) health effects could occur based on a combination of information from the EIR, scientific literature, regulatory or other health-based thresholds, and expert opinion. Each health determinant was carefully assessed using a combination of quantitative, semi-quantitative and qualitative approaches.

An evaluation matrix was developed to characterize the predicted health impacts so they could be compared and contrasted. The evaluation matrix includes consideration of various characteristics of health impacts including magnitude, likelihood, adaptability, and others. Ultimately, the aim of the assessment was to determine whether the Project could potentially have a negative, positive or no substantial effect on health. Potential health impacts were considered both on a local (close to the proposed Project Site) and community-wide scale.

Each Phase of E&B's Project was considered in the HIA:

Phase 1: Site Preparation and Construction (6-7 months)
Phase 2: Drilling and Testing (10 to 13 months)
Phase 3: Final Design and Construction (16 months)
Phase 4: Development and Operations (30 to 35 years)

Key Findings

Air Quality

The air pollutants we evaluated in the HIA included: nitrogen dioxide (NO_2), particulate matter (PM), toxic air contaminants (TAC), and odor. Predicted NO_2, PM, TAC concentrations with EIR mitigation were compared to health-based thresholds. The HIA concludes that there is no substantial effect on human health with respect to air emissions of NO_2, PM, and TAC through Phases 1 to 4. The odor-related health effect is considered negative near the Project Site due to periodic odor releases during production operations (Phases 2 and 4) that cannot be completely mitigated. Odor can have various health consequences including stress, and could result in periodic discomfort and annoyance. If frequent reports of odor occur, additional study and/or periodic monitoring of odor may be warranted.

Water & Soil Quality

The water and soil assessment considered surface water impacts from Project-related runoff to the Pacific Ocean and soil particulate emissions during construction activities. Due to the EIR mitigation measures and other factors, we concluded that there is no substantial effect on human health with respect to surface water quality and soil particulates during any Phase of the Project.

Upset Scenarios

Upset scenarios included the possibility for a crude oil spill to the ocean or a well blowout. The oil spill assessment concludes no substantial effect through Phases 1 to 4. The blowout assessment within the HIA concludes that there is a low probability of occurrence, but in the event of a blowout, there could be significant negative health implications including fatalities. The HIA also found a negative health effect of stress due to fear of a blowout accident. The HIA recommends that the City incorporate the possibility of an oil spill or well blowout into its current emergency preparedness plan.

Noise & Light

This assessment considered Project noise emissions and light emissions, including lighting safety. With respect to noise, the HIA concludes that there is no substantial effect on human health from Phase 1, 2, 3a (site construction) and 4, and a potential negative impact from pipeline construction activities in Phase 3b. Therefore, it is recommended that written notification be provided to residents and schools in the vicinity of these activities that identifies the potential for excess noise and outlines the location and duration of the impacts.

The light assessment within the HIA concludes no substantial effect on human health due to nighttime light emissions; however, there is potential for some nearby individuals to experience disruption of typical sleep patterns during periods when the drill rig is present (Phase 2 and intermittently in Phase 4). Therefore, it is recommended that black-out blinds/curtains be provided as an option for residents whose bedroom windows are in the direct line-of-sight of the exposed portion of the drill rig to eliminate any infiltration of outdoor lighting.

Traffic

The traffic assessment examined the potential for increased truck and other traffic to impact pedestrian, bicyclist, and motor vehicle safety and the potential for perceived traffic hazards to impact people's walking and bicycling choices. Primarily due to the required EIR mitigation measures, we concluded that there is no substantial effect on human health with respect to traffic safety and perceived traffic safety hazards during any Phase of the Project.

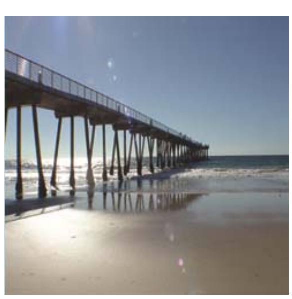
Community Livability

The community livability assessment evaluated a number of community aspects that are valued by the citizens of Hermosa, including: property values, access to green space (parks and recreation), aesthetics (view), education funding, social cohesion, and political involvement. The community livability assessment within the HIA concludes that there is: no substantial effect on human health with respect to social cohesion; a potential negative effect from stress over property values and aesthetic/visual resources (while drill rigs are erected in Phases 2 and 4); and a potential positive effect on health from enhanced funding for recreation and green space, educational funding and political involvement activities.

Monitoring

If the proposed Project is approved, the HIA provides monitoring recommendations for the City to consider. Those recommendations include:

(1) a community liaison committee to address resident's active concerns about Project activities; (2) a follow-up community health assessment to identify if some groups are disproportionately impacted by Project activities; and, (3) a quality of life survey to establish baseline conditions in Hermosa Beach, and to monitor health status changes during the Project.



Conclusion

There is no simple answer to the impact that the Project will have on the health of Hermosa Beach residents since different aspects of the proposed Project will impact the community in different ways.

We caution that the assessment and conclusions are based on population health and not on single individuals. There are some aspects of the Project that may negatively influence health (e.g., odor, well blowout, noise from pipeline construction, property values and aesthetics), and at the same time there were potential positive health outcomes identified (e.g., increased education funding, ability to enhance green space).

With the exception of a well blowout accident, the negative health outcomes were largely nuisance related (e.g., odor, noise, aesthetics) and without irreversible health impacts. As mitigated in the Final EIR, the majority of the health determinants examined revealed that the Project would have no substantial effect on the health of the community. Based on the Final EIR mitigation measures and additional recommendations provided in the HIA, on balance we do not believe that the Project will have a substantial effect on community health in Hermosa Beach. Ultimately it is the voters of Hermosa Beach who will decide whether the impacts described in this HIA are acceptable or not.

RATIONALE FOR REISSUED HIA

The first draft Health Impact Assessment (HIA) for this project was released in February, 2014. It was prepared concurrently with the draft Environmental Impact Report (EIR) and Cost Benefit Analysis. The February draft HIA was largely based on the consideration of worst case scenarios rather than refined geographic data and the fully mitigated proposed Project in the Final EIR.

McDaniel Lambert (now Intrinsik Environmental Sciences (US), Inc. [Intrinsik]) received many stakeholder comments on the February draft HIA. Written comments were submitted by the EIR consultant, community members and by the Applicant, E&B Natural Resources Management. Oral comments were also received at the presentations on the 24th and 26th of February, as well as at the Saturday Open House on March 8th. A number of the comments affected multiple parts of the document, calling for an extensive revision.

When HIAs are conducted in conjunction with EIRs it is more appropriate to assess the potential for the Project to affect health on the post-mitigation scenarios, since by law certification of the EIR requires the implementation of these measures. The reissued draft HIA and this final HIA report had the benefit of the full public process and complete analysis reflected in the Final EIR and assessed the Project on the basis of post-mitigation scenarios.

In addition, McDaniel Lambert was able to draw upon the experience of a number of experts from the parent company, Intrinsik, along with an external peer review. Therefore, the final HIA was prepared by an expanded multi-disciplinary team. This final HIA supersedes all previously released material related to the HIA including the February draft report and all corresponding presentations and/or related written material.

Intrinsik Health Impact Assessment Team

Dr. Mary McDaniel, DO, JD, MPH, Mary McDaniel is a board-certified occupational and environmental physician, licensed attorney, and risk and crisis communication expert. She brings more than 20 years of experience in health assessment, risk communication, crisis response, and occupational and environmental medicine.

Dr. Christopher Ollson, PhD, is a Senior Environmental Health Scientist. He has over 17 years of experience in leading human health risk assessments and evaluating health impacts in support of environmental assessments for a range of energy projects.

Bart Koppe, BSc, PBiol, is a Senior Risk Assessment Specialist. His expertise is in conducting health risk assessments for regulatory submissions for oil and gas-related projects. In addition, he is considered an expert in petroleum related air quality issues.

Kathleen Souweine, MPH, is an epidemiologist and has experience in both the environmental sciences and a range of epidemiological projects. She is a former analyst in the USEPA Office of Ground Water and Drinking Water.

Lindsay McCallum, MEnvSci, PhD (Candidate), is an Environmental Health Scientist. In addition to being an experienced health risk assessor she is pursuing doctoral research in health impact assessment at the University of Toronto.

Christine McFarland, BSc, is an Environmental Risk Assessor. She specializes in human health risk and air quality assessments conducted in support of environmental assessments of oil and gas projects.

Katherine Butler, MPH, is an epidemiologist who was formerly with McDaniel Lambert and a co-author of the initial Hermosa Beach draft HIA report. She has since joined the Los Angeles County Department of Public Health, where she is leading efforts to promote HIA capacity building.

External Peer Reviewer

Dr. Elizabeth Hodges Snyder, MPH, PhD is a soil and water scientist and environmental health practitioner originally trained in human and ecological risk assessment. Her interdisciplinary background includes experience in both natural science laboratory and social science research. In the years following attainment of her graduate degrees, her research program and teaching agenda have evolved to address the fields of health impact assessment (HIA) and food security. Recent works include an assessment of participant perspectives on the ability of HIA stakeholder engagement to capture and reflect factors that impact Alaska Native health, and an adapted community food assessment (CFA) in Anchorage, Alaska. Dr. Hodges Snyder is a founder of the Society of Practitioners of Health Impact Assessment (SOPHIA).

PROJECT SUMMARY

INTRODUCTION

Founded in 1907, Hermosa Beach is a small 1.43 square mile city on Los Angeles (LA) County's South Bay coastline, bordered by Manhattan Beach to the north and Redondo Beach to the south. Known as "The Best Little Beach City", it has a population of approximately 20,000 people, with a high proportion of residents between the age of 25 and 50 (US Census, 2013). Under the settlement agreement that ended litigation, an election will be held to allow City of Hermosa Beach (the City) voters to decide whether to repeal the existing ban on oil drilling within the City limits. Repealing the ban on oil drilling would allow E&B Natural Resources Management Corporation's (E&B's) proposed oil drilling and production project to move forward. In order to inform voters about the potential economic, social, environmental, and health impacts (positive and negative) of the E&B proposed oil drilling and production project, the City commissioned a Health Impact Assessment (HIA), in addition to a Cost-Benefit Analysis (CBA) and Environmental Impact Report (EIR). The EIR complies with the California Environmental Quality Act (CEQA), while the CBA and HIA are complementary documents that the City commissioned to provide community members with additional information on the proposed Project.

The proposed E&B Oil Development Project (proposed Project) consists of drilling 30 oil wells on a 1.3-acre site located on the current City Maintenance Yard property (the Site) located at 555 6th Street, at the intersection of Valley Drive and 6th Street in the City. The Site is bounded by industrial/commercial use properties to the north, south, and west. The Site is bounded by the Greenbelt, a park and recreational use space, to the east. Adjacent blocks also include residential uses located 150 feet to the north of the Project Site, 250 feet to the west and 180 feet to the east (east of the Greenbelt). The Pacific Ocean is approximately a half mile west of the Site.

If approved, the proposed Project will be completed in four Phases. Phase 1 will last six to seven months and involves construction activities associated with Site preparation for drilling and testing. Phase 2 will last 10 to 13 months and involves drilling and testing of wells in order to estimate the potential productivity and economic viability of the proposed Project. If Phase 2 determines that the proposed Project is economically feasible, Phase 3 would be carried out to prepare the Site for permanent oil and gas production facilities and to construct offsite pipelines. Phase 3 would take approximately 13 months and involve construction of additional retaining walls and final grading, extending and completing the construction of the cement well cellar, placing a small office building onsite, installation of permanent production equipment, final Site and landscaping improvements, and erecting the 32-foot sound barrier wall for noise attenuation during Phase 4 drilling. The permanent oil production facility will include tanks, vessels, piping, pumps, filters and corresponding metering equipment. Phase 4 is the final phase of the proposed Project and will maximize oil and gas recovery through the construction of an 87-foot high drill rig, the drilling of the remaining oil wells and water disposal/injection wells, and through the continuous operation of the proposed Project. It is estimated that it will take two weeks to set up the drill rig, and two and a half years to drill the remaining wells, up to a total of 30 oil wells and four disposal/injection wells. Facility operations and maintenance would be continuous for approximately 30 to 35 years, with periodic re-drills during the life of the Project.

An initial draft HIA was released in February 2014. Following receipt of a number of public comments and finalization of the EIR, the HIA underwent extensive revision and was reissued in July 2014. The reissued HIA was conducted using a multi-disciplinary approach and was subject to external peer-review by Dr. Elizabeth Hodges Snyder of the University of Alaska Anchorage. Dr. Hodges Snyder provided the HIA team with constructive feedback and a number of comments (Appendix C), all of which have been addressed in the final HIA.

HEALTH IMPACT ASSESSMENT METHODOLOGY

The World Health Organization (WHO) defines health as *"a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity"* (WHO, 1948). This definition is considered an ideal to strive for, and it forms the basic principle upon which HIA is based.

In California, an HIA is not legally required for this type of project, but an EIR is mandatory. In order to expand on existing health considerations in the EIR, the City of Hermosa Beach commissioned this HIA to help inform voters and evaluate different aspects of the proposed Project through a public health lens. The rationale for the HIA lies in its unique approach to assessing a multitude of potential impacts (both positive and negative) that could affect community health. The HIA is intended to provide additional information, as well as relying on existing information provided in the EIR, to holistically evaluate health. Although the reports are complementary, in several instances the HIA provides further details on how specific aspects of the Project could positively or negatively affect the health of the community, and proposes additional recommendations where necessary. An HIA typically consists of a series of steps that are intended to provide a structural framework around which the assessment will be conducted. Although guidance documents from around the world have slight variations on these steps, they typically include: screening, scoping, assessment, recommendation, reporting, evaluation and monitoring (Ross et al., 2014).

An HIA evaluation matrix is a tool to characterize and summarize the predicted health impacts (positive, negative, and neutral) of the proposed Project so they can be compared and contrasted. As there is no globally accepted standard for health impact characterization in HIA, the evaluation matrix used in this HIA was developed based on best practices published in a number of guidance documents and used in other assessments (Ross et al., 2014; USEPA, 2013; CDPH, 2010; IAIA, 2006; NRC, 2011).

The evaluation matrix developed for this HIA includes consideration of the different characteristics of potential impacts including geographic extent (local, widespread), magnitude, likelihood of occurrence, and others. Each of these characteristics is independently evaluated based on data from the EIR, evidence from the scientific literature, and professional judgment. A brief discussion of the Project without mitigation measures is included where applicable. However, the Project characteristics were ultimately evaluated based on a scenario where the proposed EIR mitigation measures have been implemented. The assessment focuses on the Project including mitigation measures to ensure they are adequately protective and, if not, to propose additional recommendations based on the HIA findings. The evaluation criteria are discussed in further detail below (Table PS-1).

For each health determinant evaluated in the HIA, a technical scientific assessment of the potential health impact includes a detailed discussion of all aspects of the evaluation matrix. A specific definition has been provided for each element (i.e., magnitude, adaptability, likelihood, etc.) to ensure a consistent and meaningful assessment across all determinants.

Table PS-1 HIA Evaluation Matrix

Health Determinant	List the determinant being assessed
Potential Health Outcome	List potential health outcomes associated with each determinant
Pre-Mitigation Discussion	The discussion is limited to identification of the direction of the pre-mitigation impact (positive, negative, neutral or unknown) and identification of any potential issues that could arise if no mitigation measures were implemented.
EIR Mitigation	List mitigation measures from the Environmental Impact Report (EIR), where applicable
Geographic Extent	Localized or Community
Vulnerable Populations	List subgroups that could be disproportionately affected by Project activities
Magnitude	Low, Medium, High, or Unknown
Adaptability	High, Medium, Low, or Unknown
Likelihood	Unlikely, Possible, or Probable
Post-Mitigation Health Effect	Negative, Positive, No substantial Effect, or Unknown
Comments or Additional Recommended Measures	None, or Additional Recommendations (specific and actionable)

Health Determinant: A determinant is defined as "an element that identifies or determines the nature of something." In this case, the determinant is an element of the proposed Project that has the potential to impact health in a positive or negative manner; however, the determinant itself is non-directional. The scoping section of the HIA identifies health determinants that are evaluated in detail.

Potential Health Outcome: List and discuss potential health outcomes associated with the determinant (e.g., the toxicology and physical health changes associated with exposure).

Pre-Mitigation Discussion: A brief discussion of the potential impact of the Project without mitigation is provided for completeness; however, the HIA is based only on a scenario where the mitigation measures required in the EIR have been implemented as part of the Project. The discussion is limited to identification of the direction of the pre-mitigation impact (positive, negative, neutral or unknown) and identification of any potential issues that could arise if no mitigation measures were implemented.

EIR Mitigation: What are the mitigation measures that have been identified in the EIR for this determinant that are related to health and could change the outcome of the HIA? Measures are listed based on information provided in the Final EIR.

Geographic Extent: How far are the impacts likely to reach?

- Localized: limited to the areas in close proximity to the Project Site
- Community: potential for wider scale impacts across the community

Vulnerable Populations: Are there populations that could be disproportionately affected (positively or negatively) by Project activities?

Magnitude: What is the extent of the health impact post-mitigation?

- Low: the impact is minor, it is temporary or reversible, and does not pose a hazard/benefit to health
- Medium: the impact is detectable, it is reversible, and poses a minor to moderate hazard/benefit to health

- High: the impact is substantial, it is permanent, and poses a major hazard/benefit to health
- Unknown: the impact is unclear and poses an unknown hazard/benefit to health

Adaptability: How resilient is the community to this type of change; are they able to adapt?

- High: people will be able to adapt to the change with ease and maintain pre-project level of health
- Medium: people will be able to adapt to the change with some difficulty and will maintain pre-project level of health, although some support may be necessary
- Low: people will not be able to adapt or maintain pre-project level of health

Likelihood: What is the probability of the impact occurring based on the expected frequency of the exposure?

- Unlikely: the impact is anticipated to occur rarely, if ever
- Possible: there is potential for the impact to occur on a regular basis
- Probable: the impact will almost certainly occur and persist over time

Post-Mitigation Health Effect: What is the 'direction' of the post-mitigation effect?

- Positive: the effect is expected to positively influence health following implementation of EIR mitigation measures
- Negative: the effect is expected to negatively influence health following implementation of EIR mitigation measures
- No Substantial Effect: there is no substantial effect expected following implementation of EIR mitigation measures
- Unknown: the direction of the effect following implementation of EIR mitigation measures is unknown

Comments or Additional Recommended Measures: Provide comment about the effect, and/or determine if there any additional measures recommended based on the Post-Mitigation Health Effect.

- None: there are no additional measures recommended based on the findings of the HIA
- Additional Recommended Measures: there are additional measures recommended based on the findings of the HIA (provide brief summary of recommendations)

The decision-making framework (the framework) used to weigh and evaluate each of the elements of the evaluation matrix in order to come to a final conclusion on "Post-Mitigation Health Effect" for each health determinant is provided in Figure PS-1. The elements (i.e., magnitude, adaptability and likelihood) are arranged in descending order (top to bottom) of weight and potential influence on the final determination of effect. Each pathway through the framework leads to a specific conclusion that is either directional (i.e., positive or negative) or non-directional/neutral (i.e., no substantial effect). In some cases where professional judgment dictates, it is possible to deviate from the decision making framework; however, a detailed evidence-based rationale is required to be provided in the accompanying text.

There are three different outcomes that can be used to classify a potential health effect. The classification is based solely on the definitions provided above and is intended to describe the extent of the post-mitigation health impact. The most heavily weighted aspect of the evaluation matrix is magnitude, which comprises the first level of the framework. Adaptability is the next level of the evaluation matrix as it relates to resiliency and ability to maintain health status if an impact were to occur.

This element is less heavily weighted than magnitude but does influence the final determination of effect. The final level of the matrix is likelihood, which is the probability of the impact occurring based on the expected frequency of exposure. Likelihood is less heavily weighted than magnitude but similar to adaptability, it influences the final conclusion, especially in situations where the impact is expected to occur rarely, if ever. Where an element of the evaluation matrix is classified as 'unknown' a discussion of the uncertainty and potential influence of this limitation on the conclusions must be provided. In these scenarios, the determination of effect is largely based on professional judgment and sound rationale.

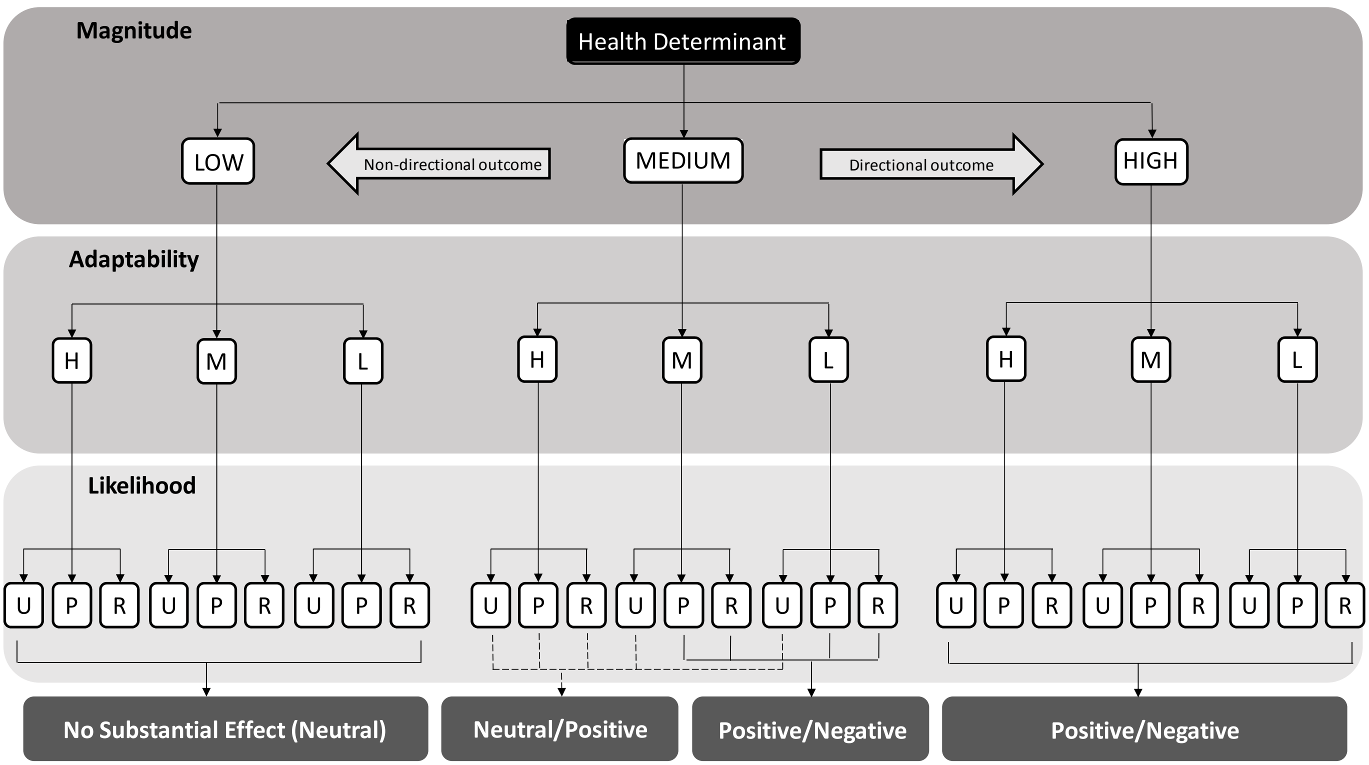


Figure PS-1 Decision-Making Framework for the HIA Evaluation Matrix (H = high; M = medium; L = low; U = unlikely; P = possible; R = Probable)

ASSESSMENT AND RECOMMENDATIONS

The assessment process in HIA involves: (1) developing a health baseline profile, (2) assessing the likely impacts, and (3) characterizing the health impacts. The baseline health assessment establishes the current health status of the City of Hermosa Beach residents in order to evaluate whether the current profile of the community reveals vulnerabilities to any of a number of health outcomes, and also to provide a benchmark so that the HIA can predict the extent of change from current health conditions. The baseline assessment found that Hermosa Beach is a relatively young community that is highly educated, has above average income levels, and a higher sense of well-being than other California residents. Overall, demographic indicators show that Hermosa Beach is not highly vulnerable to negative health outcomes traditionally associated with poverty, unemployment, and low educational attainment.

The HIA considered 18 determinants of health that fall under six major categories (i.e., air quality, water and soil quality, upset conditions, noise and light emissions, traffic, and community livability). Consideration was given to those determinants that were identified as community priorities and are most likely to be impacted by the proposed Project. Each of these outcomes was carefully assessed using a combination of quantitative, semi-quantitative and qualitative approaches where appropriate. Ultimately, the aim of the assessment was to determine whether the Project (post-mitigation) could potentially have a negative, positive or no substantial effect on health. Potential health impacts were considered both on a local (adjacent to the proposed Project Site) and community-wide scale.

Air Quality

The potential for air emissions from construction and operation of the proposed Project to affect air quality in Hermosa Beach was evaluated using the emissions inventory produced as part of the EIR. The air pollutants carried forward for assessment in the HIA included nitrogen dioxide (NO_2), particulate matter (PM), toxic air contaminants (TAC), and hydrogen sulfide (H_2S) and other odorous compounds.

The air quality assessment within the HIA concludes that with implementation of the proposed EIR mitigation measures there is no substantial effect on human health with respect to air emissions (NO_2, PM and TAC). However, periodic odor releases, identified in the EIR as significant and unavoidable, were characterized as negative near the Project Site. Odor can have various health consequences, and could result in periodic discomfort and annoyance near the Project Site.

Nitrogen dioxide (NO_2) has the potential to produce a range of respiratory effects depending on the concentration in air (e.g., eye, nose and throat irritation, inflammation of lung tissue). For the assessment, the maximum 1-hour and maximum annual average NO_2 air concentrations were calculated (background plus Project) and found to be below the WHO air quality health guidelines, indicating that adverse health effects are not expected to result from either short-term or long-term exposure. Additionally, there were no exceedances of California's Ambient Air Quality Standards (AAQS), or the US EPA National Ambient Air Quality Standards (NAAQS) for NO_2. Therefore, it was concluded that exposure to NO_2 from the proposed Project (post-mitigation) is expected to have 'no substantial effect' through the duration of the proposed Project and no additional recommendations were required.

Particulate matter (PM) is a widespread air pollutant composed of a mixture of solid and liquid particles, and its effects on health are well documented. Particles with a diameter of 10 micrometers or smaller are referred to as PM_{10}, and particles with a diameter of 2.5 micrometers or smaller are known as $PM_{2.5.}$ Exposure, particularly to the smaller $PM_{2.5}$ particles, is associated with increased respiratory and cardiovascular disease and mortality. The maximum 1-hour and maximum annual average $PM_{2.5}$ air concentrations were added to baseline concentration in LA County and resulted in exceedances of the WHO air quality guidelines. However, when background levels from South Coastal Los Angeles County (assumed to better represent Hermosa Beach air quality) were used, the Project was below the California annual AAQS or US EPA NAAQS. The assessment concluded that any exceedances of the WHO air quality guidelines are based on existing background levels in the area and the Project is not expected to have a material impact on existing $PM_{2.5}$ related health risks. While there is no substantial effect from post-mitigation exposure to $PM_{2.5}$ through the duration of the proposed Project, existing ambient levels of $PM_{2.5}$ air concentrations in the area are already in the range at which increased mortality has been observed in large urban centers.

Toxic Air Contaminants (TAC) can be used to describe a wide array of chemicals, including volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), hydrogen sulfide (H_2S), inorganic elements (e.g., metals) and particulate emissions from diesel exhaust. Without mitigation measures, Project emissions of certain TAC would pose a potential risk to human health; however, with implementation of the measures proposed in the EIR, the proposed Project is expected to have no substantial effect through the duration of the proposed Project and no additional recommendations were required.

Odor can result from the release of compounds such as H_2S. Sensitivity to environmental odors varies greatly from person to person. The most commonly reported symptoms from odor exposure are headaches, nasal congestion, eye, nose, and throat irritation, hoarseness, sore throat, cough, chest tightness, and shortness of breath, among others. According to the WHO, odor annoyance can also affect overall quality of life. Adverse health outcomes associated with odor are related to the frequency, duration, concentration, and the individuals' level of sensitivity. Hydrogen sulfide is the primary odor associated with oil and gas production and it has a relatively low odor threshold. The H_2S odor threshold (*i.e.,* the lowest concentration perceivable by human smell) is highly variable within the human population and can be detected at concentrations as low as a half of a part per billion (0.5 ppb). Although mitigation measures proposed in the EIR would reduce the frequency of odor releases, they were still identified as 'significant and unavoidable' during production operations (Phases 2 and 4) because of the close proximity of residences and businesses to the Project. For these reasons, the odor-related health effect is considered 'negative' near the Project Site and additional recommendations have been provided (i.e., an odor study and/or periodic monitoring in the event of excessive reports of odor).

Water and Soil Quality

The water and soil quality assessment within the HIA concludes that with implementation of the proposed EIR mitigation measures, there is no substantial effect on human health with respect to surface water quality and soil particulates.

If uncontrolled, Site-related chemicals in polluted stormwater runoff water could be detrimental to the environment and human health. For people swimming or recreating in the Pacific Ocean, contact with polluted stormwater runoff could result in acute health symptoms such as eye and skin irritation. Runoff from the proposed Project site generally flows to the west towards an inlet that discharges to the Ocean at an outfall at the end of Herondo Street. During a rain event, contaminants and debris that enter the storm drain system could flow into the nearby Santa Monica Bay, which is currently listed as an "impaired water body" for 'contact' recreation. During Phase 2 and 4 drilling operations, surface runoff at the Project site would be contained with walls and berms and pumped into the water processing system for injection into the oil reservoir; therefore, preventing negative impacts to surface water quality and potential health outcomes during operations. Without mitigation, construction-related contaminants and debris flowing into storm drains connected to the Pacific Ocean could result in impacts to water quality and increases in acute health outcomes during Phases 1 and 3 of the proposed Project. However, EIR mitigation measures will reduce the possibility of construction-related impacts to the Pacific Ocean through the requirement of a Storm Water Pollution Prevention Plan. Overall, the potential health impact associated with surface water is classified as no substantial effect because Site runoff will be controlled during all Project phases.

Soils under the current maintenance yard and potential Project Site have contamination related to its former use as a landfill. While the Site is currently paved over and thus not posing any present hazard, Project-related construction activities will release particulate emissions when equipment moves on soil or unpaved surfaces and during trenching, grading, and other earth-moving activities. The primary contaminant of concern in onsite soil is lead; however, on-site surface soil data is limited and the top 3 feet of soil is not currently well characterized with respect to potential contamination. Therefore, additional surface soil data is important to address in order to determine the potential health hazard posed by chemicals in soil prior to Phase 3 RAP activities. The EIR required mitigation measure SR-2 addresses this data gap by requiring the Applicant to sample soil during Phase I grading and remove soil contamination exceeding regulatory thresholds from the Site as early as Phase 1 if substantial contamination is present. Implementation of the RAP to remove contaminated soil and mitigation measures to reduce fugitive dust emissions will reduce the possibility of hazardous soil particulate emissions during Project- related activities and thus soil particulates do not pose a substantial effect to human health through the duration of the proposed Project.

Upset Scenarios

This HIA evaluated the health impacts of two upset scenarios, an offsite oil spill and a well blowout. Potential human health impacts of exposure to an offsite oil spill include headaches, eye/skin irritation, respiratory conditions, anxiety, and depression. In the unlikely event of a spill (0.07% chance of an oil spill to the ocean), E&B would be required to contain and clean-up any crude oil in the environment, thus irreversible or chronic health outcomes would not be expected to occur and the HIA concludes ‘no substantial effect’ related to the oil spill health determinant through the duration of the proposed Project.

In the oil spill assessment concludes there is no substantial effect with implementation of the proposed EIR mitigation measures. The blowout assessment within the HIA concludes that there is a low probability of occurrence, but in the event such upset scenarios were to occur, they could have significant negative health implications. The HIA also found a negative health effect of stress due to fear of a blowout accident. The HIA recommends that the City incorporate the possibility of an oil spill or well blowout into its current emergency preparedness plan.

A well blowout could result in serious injuries and/or fatalities among community members in the vicinity of the proposed Project Site. A well blowout is a very low probability event, predicted to occur once in 323 years during drilling and once in 604,127 years during non-drilling periods if the wells are pressurized. The fear of a blowout accident could result in moderate impacts to human health due to elevated levels of distress over the possibility that a blowout could occur. Because a well blowout could have severe health consequences and the possibility of an upset scenario occurring cannot be completely avoided through mitigation, the blowout assessment concludes a ‘negative’ health effect. In addition to emergency response plans prepared by E&B, the City should consider incorporating the possibility of an oil spill or well blowout into their current public preparedness awareness program.

Noise and Light Emissions

Noise is ubiquitous in suburban/urban and commercial areas. Health implications associated with exposure to excess noise are typically focused on nighttime sleep disturbance. Since the Project-related activities predicted to produce the highest noise levels were only permitted during daytime hours, nighttime impacts of noise are not a primary concern in the current HIA. The impact of Project-related noise emissions on the local community, particularly residents located around the Project Site and along the pipeline and truck routes is negative without the use of mitigation measures; however, the EIR has identified a variety of mitigation techniques to reduce the potential impact of noise on the surrounding community including a 35-foot acoustical barrier around the Project site. Based on the current HIA, there is expected to be no substantial effect on human health resulting from project activities in Phases 1, 2, 3a (site construction) and 4. There is some potential for negative health effects from high levels of noise associated with pipeline construction (Phase 3b); however, this is expected to be short-term in duration (approx. one week per location) and is limited to daytime hours. Therefore, for Phase 3b (pipeline construction), it is recommended that local residents and local schools be provided with written notification of the impending work that identifies the potential for excess noise and outlines the location and duration (expected to be short-term: 1 week) of the impacts.

The noise assessment within the HIA concludes that, with implementation of the proposed EIR mitigation measures, there is no substantial effect on human health from Phase 1, 2, 3a (site construction) and 4, and a potential negative impact from pipeline construction activities in Phase 3b. Therefore, it is recommended that written notification be provided to residents and schools in the vicinity of these activities that identifies the potential for excess noise and outlines the location and duration of the impacts.

The invention and widespread use of artificial light, especially at night, has become a necessity in many areas of the world to enhance commerce, promote social activity, and increase public safety. Despite the fact that the use of artificial light is a widespread consequence of industrial and economic development, it can have unintended negative consequences, especially when it becomes inefficient, annoying and unnecessary. The major health concern related to excessive light-at-night is disruption of sleep and biological circadian rhythms which influence melatonin production and promote overall health. To ensure visibility, site security and worker safety artificial lighting will be installed as part of the proposed Project. The majority of the on-site lighting will be shielded and downcast to reduce glare. Additionally, the site will have a 32-foot acoustical barrier that will eliminate light spill beyond the Site boundary in most cases. The one exception to this is the presence of lighting on the electric drill rig, which extends up to 87 feet. Residents who have a line-of-sight view of the exposed side of the electric drill rig from their bedroom window(s) may be disproportionately impacted. For these individuals, it is recommended that black-out blinds or curtains be provided as an option for those who would like blinds/curtains but do not wish to pay for them themselves to help eliminate the potential for infiltration of light emissions from the nighttime lighting on the drill rig.

The light assessment within the HIA concludes that, with implementation of the proposed EIR mitigation measures, there is no substantial effect on human health with respect to light emissions; however, there is potential for nearby individuals to experience disruption of typical sleep patterns. Therefore, it is recommended that black-out blinds/curtains be provided as an option for residents whose bedroom window(s) are in the direct line-of-sight of the exposed portion of the electric drill rig to eliminate any infiltration of

Traffic

Increases in traffic volume are associated with increased risk of injury and death due to vehicle-vehicle, vehicle-pedestrian, and vehicle-bicycle collisions. Currently, fatalities resulting from motor vehicle collisions are very rare in the pedestrian and bike-friendly City of Hermosa Beach. A Traffic Impact Analysis (TIA) prepared by Arch Beach Consulting (2013) concluded that project-related traffic would not significantly impact the level of service on any of the studied roadway segments and therefore the EIR indicated that project-related traffic will not have a significant impact on traffic congestion. However, the introduction of truck traffic on roads not accustomed to large trucks could represent a safety hazard to bicyclists and pedestrians. Consequently, the EIR recommends additional mitigation including increased crossing guard presence at the Site, installation of warning signs and lights, ensuring that trucks are not too long, and reconfiguring Valley Dr. Overall, with safety measures in place, and because of the limited extent of increased traffic, traffic safety is not predicted to have a substantial health impact in the community through the duration of the proposed Project.

The traffic assessment within the HIA concludes that, with implementation of the proposed EIR mitigation measures, there is no substantial effect on human health with respect to traffic safety and perceived traffic safety hazards.

Findings from the literature suggest that perception of safety is an important mediator of the relationship between traffic safety and active transportation, or walking/bicycle trips. Perceived risk of injury may discourage walking and bicycling, which can directly impact health by decreasing physical activity levels. Parental perception of safety is especially important for rates of walking and biking among children. Since the Project Site lies on a safe walk to school route, there is a possibility that perceived traffic hazards could result in decreased active transportation. However, the impact is limited to a portion of Valley Drive. and most community members should be able to adapt to the increased perception of traffic hazards by seeking alternative routes for walking and biking. Therefore, no additional measures are recommended.

Community Livability

Community livability defines elements that make it desirable to live in a particular place. These can include environmental, social and economic elements. For the proposed Project, local residents voiced certain concerns they have regarding different aspects of community livability. The following health determinants associated with community livability were identified and assessed as part of the HIA: property values; access to recreational resources and green space; aesthetics and visual resources; education funding; social cohesion; and, political involvement.

The community livability assessment within the HIA concludes that with implementation of the proposed EIR mitigation measures there is: no substantial effect on human health with respect to social cohesion; a potential negative effect from stress over property values, aesthetic/visual resources; and a potential positive effect on health from enhanced recreation and green space, educational funding and political involvement activities.

Commercial and industrial developments have the potential to impact local property values. The complexities around property value fluctuations make it difficult to accurately evaluate the potential impact from one project. The CBA concluded that property values within Hermosa Beach could be impacted by 0-10%; and it was suggested that any decrease in property values is likely to be localized. Any perceived or actual decrease has the potential to moderately increase stress and anxiety among Hermosa Beach residents, which is suggestive of a negative effect on human health. To reduce any potential stress or anxiety that local property owners may experience as a result of the proposed Project, E&B could consider having a property value analysis conducted.

Access to recreational areas and green space is an important community resource and a key component of overall health and well-being. Hermosa Beach residents are considered to be very active due to their proximity to the beach, access to parks and availability of recreation and fitness facilities. While the proposed Project would not be removing any existing green space in the community, it will be located adjacent to a park, near other parks, and near walking and biking travel routes. Disturbances during pipeline and Site construction (Phases 1 and 3) could temporarily affect ready access of recreational resources or the quality of the recreational experience. On the other hand, Project revenue could be used to enhance recreational resources, and it is predicted that there will be an overall positive impact on community health in regards to recreation and green space. It is recommended that a community advisory group be formed to aid the City in deciding priority for recreational / green space funding.

Aesthetic value is a complex concept that is highly subjective. There is a high degree of individual variability when it comes to the visual impact and/or aesthetic value of an object or a place. The presence of the electric and workover drill rigs during Phase 2 and 4 have the potential to negatively impact health by diminishing the aesthetic appeal of the landscape. This has the potential to influence levels of annoyance and stress; however, this is not anticipated to have a substantial effect on health. Therefore, the post-mitigation health effect is considered negative. No additional recommendations have been made.

Educational funding can provide improvements in some of the key indicators of socioeconomic status (i.e., occupation and income) and has been described as a cost-effective method of increasing health and well-being. Hermosa Beach has one of the top school districts in the country and the modest increase in annual funding that will be provided to the schools as a result of revenue from oil production is expected to have a positive effect on health now and in the future. This positive effect is expected for all Phases of the Project.

Social cohesion is a complex concept that is difficult to measure and is related to the interactions between community members. Some local residents have voiced concerns about the situation causing a division in the community – those in favor of oil development versus those opposed. As an indicator of health, social cohesion is linked to the idea of ‘quality of life’ which is associated with certain aspects of health and well-being. Hermosa Beach residents experience higher levels of well-being than most California cities. Although it is not expected that all residents will experience a reduction in social cohesion due to differences of opinion, some individuals may. For those residents, this could result in increased stress; however, social cohesion is not considered to have a substantial effect on community health.

Active involvement in local politics is associated with increased self-efficacy and can have positive impacts on health and well-being. Hermosa Beach residents have the unique opportunity to decide whether the proposed Project can go ahead by voting on whether to allow oil drilling within the City. This opportunity extends to all adult members of the community, although only a subset of the population is actively involved in the politics and may benefit from the positive impact on health.

MONITORING AND EVALUATION

The following monitoring recommendations have been made for the City to consider including in discussions around the Development Agreement:

- Community Liaison Committee: Consideration should be given to forming a Community Liaison Committee (CLC) if the Project is approved, and prior to commencement of construction activities. The CLC would serve as the vehicle through which citizens could voice active concerns about Project activities. The intention of the committee would then be to work collectively to find ways of addressing resident's concerns.
- Follow-up Community Health Assessment: Analysis of health statistics by susceptible subpopulation status could identify whether some groups are disproportionately impacted by Project operations. An update to the baseline health study could be completed five years after the Project becomes operational, but would depend on the level of concern within the community at that time.
- Quality of Life Health Survey: A quality of life (QOL) health survey could be used as a tool to establish current baseline conditions, and to monitor whether health status changes during the Project. There are well established survey tools available (SF-36 and Pittsburgh Sleep Quality Index [PSQI]) that could be employed. The most cost-effective means of delivering these surveys would be on-line; however, data quality collection can be compromised. Mail drops could also be considered. This survey would then be followed up after operations began.

Although not a component of all HIAs, the evaluation step can demonstrate the effectiveness of HIA in the planning process by showing what the assessment actually achieved. An internal evaluation of the overall approach and effectiveness of the HIA will be conducted internally by Intrinsik's HIA team. The City of Hermosa Beach may also wish to evaluate the utility of the HIA to identify aspects of the process that were beneficial and those that could be enhanced in the future.

CONCLUSION

There is no simple answer to the potential impact that the Project will have on the health of Hermosa Beach residents since different aspects of the proposed Project will impact the community in different ways. We caution that the assessment and conclusions are based on population health and not on single individuals. There are a number of aspects of the Project that may positively influence health (e.g., increased education funding, ability to enhance green space), and at the same time there were potential negative health outcomes identified (e.g., odor, well blowout, noise from pipeline construction, property values, and aesthetics). With the exception of a well blowout accident, the negative health outcomes were largely nuisance related (e.g., odor, noise, aesthetics) without irreversible health impacts. The majority of the health determinants examined revealed that the Project (post-mitigation) would have no substantial effect on the health of the community.

Based on the Final EIR mitigation measures and additional recommendations provided in the HIA, on balance we do not believe that the Project will have a substantial effect on community health in Hermosa Beach. Ultimately it is the voters of Hermosa Beach who will decide whether the impacts described in this HIA are acceptable or not.

Table PS-2 Health Impact Assessment Summary Based on Post-Mitigation Measures

Health Determinant	Potential Health Outcome	EIR Mitigation Measures	Geographic Extent	Vulnerable Populations	Magnitude	Adaptability	Likelihood	Post-Mitigation Health Effect	Comments or Additional Recommended Measures
Air Quality									
Nitrogen Dioxide (NO_2) Emissions	Respiratory irritation and airway constriction	NOx reduction program (AQ-1b), limited flaring (AQ-3a), and air monitoring plan (AQ-5d)	Localized	Children; elderly; pre-existing cond	Low	High	Unlikely	No substantial effect	None
Particulate Matter (PM) Emissions	Morbidity (e.g., cardio-pulmonary effects) and mortality.	Limited flaring (AQ-3a), limited microturbine PM emissions (AQ-4), air monitoring plan (AQ-5d), and diesel emission requirements (AQ-7a)	Localized	Children; elderly; pre-existing cond	Low	High	Unlikely	No substantial effect.	None
Toxic Air Contaminants (TAC) Emissions	Varies for the TACs. Includes acute effects, chronic non-carcinogenic and carcinogenic effects.	Air quality mitigation measures (AQ-1a, AQ-1b, AQ-3a, AQ-3b, AQ-4, AQ-5a through AQ-5f, AQ-6, AQ-7a, AQ-7b)	Localized	Children; elderly; pre-existing cond	Low	High	Unlikely	No substantial effect.	Cancer risks, chronic non-cancer risks and acute risks will be below threshold values post-mitigation.
Odor Emissions	Acute health symptoms from odiferous compounds in crude oil	Air quality mitigation measures to reduce off-gassing of vapors from drilling muds (AQ-3b) and for operational odor controls including an Odor Minimization Plan (AQ-5a through AQ-5f)	Localized	Odor sensitive individuals	Medium	Low	Possible	Negative	Periodic discomfort and annoyance from odor releases is likely. If frequent reports of odor occur, additional study and/or periodic monitoring of odor may be warranted.
Water and Soil									
Surface Water	Acute health symptoms	Storm Water Pollution Prevention Plan (HWQ 1-1a to 1-1g)	Localized	Beach users	Medium	Medium	Unlikely	No substantial effect	None
Soil Particles	Varying degrees of human health risk	Fugitive Dust Control Plan (AQ-1a) and soil sampling (SR-2)	Localized	Children	Unknown	Unknown	Unlikely	No substantial effect	None
Upset Scenarios									
Crude Oil Spill	Acute health symptoms and psychological effects including stress	An independent third party audit of equipment and additional upset scenario risk reduction measures (SR-1a through SR-1g)	Localized	People in immediate vicinity	Medium	Medium	Unlikely	No substantial effect	Incorporate well blowout scenario into the City of Hermosa preparedness plan
Well Blowout	Injuries and/or fatalities and psychological effects including stress	An independent third party audit of equipment and additional upset scenario risk reduction measures (SR-1a through SR-1g)	Localized	People in immediate vicinity (est. max 750 ft)[1]	High	Low	Unlikely	Negative	Incorporate well blowout scenario into the City of Hermosa preparedness plan
Noise and Lighting									
Noise Emissions	Annoyance, stress, sleep disturbance and hypertension and cognitive impairment at very high sound pressure levels	Noise mitigation measures Phase 1: NV-1a to NV-1c Phase 2: NV-2a to NV-2j; NV-3a to NV-3d Phase 3a (site construction): NV-4a to NV-4c Phase 3b (pipeline construction): none Phase 4: NV-6a to NV-6h; NV-7a to NV-7c	Phase 1-4: Localized (Project Site and truck /pipeline routes)	Residents and schoolchildren in proximity to pipeline route	Phase 1: Low Phase 2: Low Phase 3a: Low Phase 3b: Medium Phase 4: Low	Phase 1: High Phase 2: High Phase 3a: High Phase 3b: Medium Phase 4: High	Phase 1: Possible Phase 2: Possible Phase 3a: Possible Phase 3b: Probable Phase 4: Possible	Phase 1: No substantial effect Phase 2: No substantial effect Phase 3a: No substantial effect Phase 3b: Negative Phase 4: No substantial effect	In anticipation of potential elevated noise levels from pipeline construction activities (Phase 3b) it is recommended that local residents be provided with written notification of impending work including the dates and times of activities that may produce excessive noise.
Light Emissions	Annoyance, stress and possible disturbance of typical sleep cycles	Light mitigation measures Phases 2-4: AE-4a to AE-4c; AE-5a to AE-5e; AE-6a to AE-6b	Localized	People with a direct line-of-site of the lit side of electric drill rig at night	Low	High	Unlikely	No substantial effect	Although the magnitude is 'low' for the majority of residents, it could be higher for those individuals with a bedroom window in the direct line-of-sight of the exposed side of the electric drill rig that will be lit at night. It is recommended that these individuals be provided with the option of black-out blinds or curtains to eliminate any potential impact to typical sleep patterns.

Table PS-2 Health Impact Assessment Summary Based on Post-Mitigation Measures (con't)

Health Determinant	Potential Health Outcome	EIR Mitigation Measures	Geographic Extent	Vulnerable Populations	Magnitude	Adaptability	Likelihood	Post-Mitigation Health Effect	Comments or Additional Recommended Measures
Traffic									
Traffic Safety	Potential increase in number of pedestrian, bicycle or other injuries	Traffic mitigation measures (TR-1a through TR-1d)	Localized	Pedestrians and cyclists (Children and the elderly)	High	Medium	Unlikely	No substantial effect	None
Perceived traffic hazards	Decrease in active transportation	Traffic mitigation measures (TR-1a through TR-1d)	Localized	Pedestrians and cyclists (Children)	Medium	Medium	Unlikely	No substantial effect	None
Community Livability									
Property Values	Potential increase in stress and anxiety	Not Applicable	Localized	Property owners	Medium	Medium	Possible	Negative	E&B could consider evaluating housing prices for those in the immediate vicinity of the Project Site.
Access to Recreational Resources and Green Space	Change in physical activity levels, which can lead to other health issues	Not Applicable	Community	None	Medium	High	Possible	Positive	To maximize potential health benefits from access to green space and recreational activities the City should form a community advisory group on how to spend revenue.
Aesthetics and Visual Resources	Annoyance and stress from negative perceptions and anxiety over project aesthetics	Aesthetic and visual mitigation measures AE-1a to AE-1b; AE-2a to AE-2d; AE3a to AE-3c	Community	None	Medium	Medium	Possible	Negative	The overall impact is negative based on the aesthetic environmental change leading to increased levels of annoyance and stress in some individuals.
Education Funding	Increased resources and funding for education can indirectly lead to a more positive health status	Not Applicable	Community	Schoolchildren	Medium	High	Probable	Positive	None
Social Cohesion	Potential increase in stress	Not Applicable	Community	None	Low	Medium	Possible	No substantial effect	None
Political Involvement	Increase in self-efficacy and positive impacts on health and well-being over communities ability to vote	Not Applicable	Community	Voters	Medium	High	Possible	Positive	None

[1]Figures 4.8-5 and 4.8-6 of Final EIR provide estimated range and map, respectively (MRS, 2014)

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Glossary of Terms, Acronyms, and Abbreviations

AAQS	Ambient Air Quality Standards
ACS	American Cancer Society
BCHD	Beach Cities Health District, serving Manhattan, Hermosa, and Redondo Beaches
BTEX	Acronym for benzene, toluene, ethylbenzene and xylenes, compounds commonly found in petroleum derivatives
Cal/EPA	California Environmental Protection Agency
CARB	California Air Resources Board
CBA	Cost-benefit analysis, a method of considering the advantages and disadvantages of a project by converting all outcomes into monetary values
CEQA	California Environmental Quality Act, legally requires EIR
City	City of Hermosa Beach
CNEL	Community Noise Equivalent Level
CNS	Central Nervous System
CO	Carbon monoxide
Community Dialogue	A group of 15-30 community members engaged in activities to help define the quality of life and vision for the future of Hermosa
COPD	Chronic Obstructive Pulmonary Disease
CUP	Conditional Use Permit approved on August 12, 1993, which the proposed project must comply with
dB	Decibel - A unit of a logarithmic scale of power or intensity called the power level or intensity level
dBA	A-weighted decibel, to approximate human sensitivity to sound
DDT	Pesticide banned by the USEPA in 1972 due to environmental effects
Determinants of health	Factors that contribute to the health of individuals or communities
EPA	Environmental Protection Agency
E&B	E&B Natural Resources Management Corporation
EIR	Environmental Impact Report, the analysis of the environmental effects of a project and reasonable alternatives to it, mandated by CEQA

Footcandle	The illuminance at a point on a surface which is one foot from, and perpendicular to, a uniform point source
H_2S	Hydrogen sulfide
HBEF	Hermosa Beach Education Foundation
HHRA	Human Health Risk Assessment
HI	Hazard Index
HIA	Health Impact Assessment, a combination of procedures, methods, and tools by which a project can be judged as to its potential effects on the health of a population
IARC	International Agency for Research on Cancer
Incidence rate	A measure of the new cases of illness during a specified time period
KOP	Key Observation Point
LACDPH	Los Angeles County Department of Public Health
LAN	Light-at-Night
Ldn	Sound level measured over the 24 hour period, with a 10 dB penalty added to the levels between 23.00 and 07.00 hours
L_{eq}	Equivalent sound level, or the average noise level over a period of time
LOS	Level of service, related to the degree of traffic congestion at intersections
lux	The illuminance at the same point at a distance of 1 meter from the source
MATES	Multiple Air Toxics Exposure Study
MATES III	Multiple Air Toxics Exposure Study III
Morbidity	Refers to the presence of disease in an individual or population
Mortality rate	A measure of the frequency of death in a defined population during a specified time interval
NAAQS	National Ambient Air Quality Standards
NO_x	Oxides of Nitrogen
NNG	Night Noise Guidelines
OEHHA	California Office of Environmental Health Hazard Assessment
PAHs	Polycyclic aromatic hydrocarbons
PCE	Passenger car equivalence
PCB	Polychlorinated biphenyl, PCBs are no longer commercially produced in the US due to toxicity

PCH	Pacific Coast Highway, the most trafficked roadway in Hermosa Beach
PM	Particulate matter, particles with a diameter smaller than 10 µm are referred to as PM_{10}, and particles with a diameter smaller than 2.5 µm are known as $PM_{2.5}$
PMI	Point of Maximum Impact
ppb	Parts per billion
ppm	Parts per million
proposed Project	Proposed E&B oil drilling and production project
REL	Relative Exposure Level
SCAQMD	Southern California Air Quality Monitoring District
SES	Socio-economic Status
SIR	Standardized incidence ratio, quotient of observed and expected number of cases (e.g., cancer cases)
Site	Proposed project site, at the current City Maintenance Yard
SO_2	Sulfur dioxide
SWPP	Storm Water Pollution Prevention Plan
TAC	Toxic Air Contaminant
TMDL	Total maximum daily load, a regulatory water quality requirement
TPH	Total petroleum hydrocarbons
TIA	Traffic impact analysis
USEPA	United States Environmental Protection Agency
$\mu g/m^3$	Microgram per meter cubed
VOCs	Volatile organic compounds
WSB	Walking school bus
WHO	World Health Organization

1.0 PROJECT INTRODUCTION

Under the settlement agreement that ended litigation with Macpherson Oil Company, an election will be held to allow the City of Hermosa Beach (the City) voters to decide whether to repeal the existing ban on oil drilling within City limits. Repealing the ban on oil drilling would allow the E&B Natural Resources Management Corporation's (E&B's) proposed oil drilling and production project to move forward (Macpherson Oil sold its interests to E&B at the time of the settlement agreement). The terms of the settlement agreement provide that, if voters agree to lift the ban, the City will enter into a development agreement with E&B to develop an oil drilling and production facility (the Project) at the City Maintenance Yard (the Site) and the City will owe E&B $3.5 million. If the voters do not lift the ban on oil drilling the City of Hermosa Beach would owe E&B a total of $17.5 million.

In order to inform voters about the potential economic, social, environmental, and health impacts and/or benefits of E&B's proposed oil drilling and production project, the City commissioned a Health Impact Assessment (HIA), in addition to a Cost-Benefit Analysis (CBA) and Environmental Impact Report (EIR). The EIR complies with the California Environmental Quality Act (CEQA), while the CBA and HIA are complementary documents that the City commissioned to provide community members with additional information on the proposed Project.

If the proposed Project is approved by Hermosa Beach voters, the agencies that will oversee and participate in environmental and safety reviews include the California Coastal Commission, the State Lands Commission, the South Coast Air Quality Management District, the State Division of Oil, Gas and Geothermal Resources, and the City of Hermosa Beach, among others.

1.1 City of Hermosa Beach

Founded in 1907, Hermosa Beach is a small 1.43 square mile City on Los Angeles (LA) County's South Bay coastline, bordered by Manhattan Beach to the north and Redondo Beach to the south. Known as "The Best Little Beach City", it has a population of approximately 20,000 people, with a high proportion of residents between the age of 25 and 50 (US Census, 2013). The City is a desirable place to live for many reasons especially the year-long mild temperatures, ranging from highs of 67 degrees in the winter to 77 degrees in the summer and nighttime temperatures that rarely dip below 50 degrees. Residents often keep windows open year-round, and use of heating and air-conditioning units are rare. The City is also known as being a popular place for outdoor activities such as surfboarding, volleyball, skateboarding, jogging and bicycling, among others. There is a popular wood chip jogging/walking trail (the "Greenbelt") running north-south between Valley Drive and Ardmore Avenue, one of the main transportation routes that traverses the length of Hermosa Beach, and connecting the City to its northern and southern beach city neighbors. It is regularly used by residents and visitors for exercise, outdoor recreation, and active transport through the City. A diverse restaurant and bar scene also creates a vibrant nightlife in Hermosa.

Together with Manhattan Beach and Redondo Beach, Hermosa is part of what is known as the "Beach Cities". Hermosa Beach has its own elementary schools and middle school but high school students are served by either Manhattan Beach or Redondo Beach. Hermosa also shares public transportation and health services with the two other Beach Cities. The City of Hermosa has its own police and fire departments, a community theater, and senior center.

1.2 Oil Development and Production Activities

The current boom in domestic crude oil production is approaching the historical high achieved in 1970 of 9.6 million barrels per day (EIA, 2013). Projections and analysis summarized in the Energy Information Administration's *Annual Energy Outlook 2014 Release Overview* attribute the growth in domestic production to improvements in advanced technologies for crude oil and natural gas production. Specifically for U.S. production of crude oil, projections for higher production volumes result mainly from increased onshore oil production, primarily from formations with low permeability. California remains one to the top producers of crude oil in the nation, accounting for almost one-tenth of the total U.S. production (EIA, 2013). Petroleum reservoirs are concentrated in geologic basins along the Pacific Coast and in the Central Valley. Los Angeles is considered the most urban oil field in the country, with a long history of the petroleum industry operating in non-industrial areas (CLUI, 2010). Due to the high cost of land in the Los Angeles basin, there has been economic incentive to develop modern drilling technology that allows oil wells to be concentrated into smaller areas. Directional drilling techniques decrease the industry's surface footprint while increasing the subsurface drillable area. Since industrial processes are generally not desired in densely populated areas due to environmental and health concerns, many oil drilling sites in Los Angeles have incorporated mitigation measures (e.g. noise muffling, visual barriers, closed-loop systems) to help reduce the potential impacts on surrounding communities.

There are 34 known active oil fields in the Los Angeles Basin spread out across the regions of Inglewood, Westside and Downtown, Eastern Los Angeles and Inland, the Coast and South Bay, Harbor and Long Beach, and the South Coast (Appendix A). The active oil fields vary greatly in size and in oil production volumes. Small fields like Chino-Soquet produce just over 1,000 barrels of oil per year while Wilmington, the most productive oil field in the Los Angeles Basin, produces about 3.5 million barrels per year from 1,300 active wells. Many of the wells operate in densely populated urban areas. For example, the Beverly Hills Oil Field is accessed from three urban well sites, including one within Beverly Hills High School and another on Pico Boulevard hidden from view by a windowless four-walled structure that appears to be an office building to the passerby. Given the long history of oil drilling in Los Angeles, the wells and pumpjacks were often present before suburban housing developments encroached upon drilling leases.

Appendix A summarizes some of the known issues associated with urban drilling sites. Various health and environmental concerns surround production at the Inglewood oil field, which covers 950 acres in urbanized Los Angeles. In 2006, noxious gases entrained in drilling muds were released and detected by neighbors more than 1,000 feet from drilling activities. As a result of several investigations, a 2011 CEQA lawsuit settlement required the operator to: reduce drilling of new wells, increase air quality monitoring, and adhere to more stringent noise limits. Additionally, LA County was required to perform mandatory health assessments with environmental justice components. Other health concerns from urban oil drilling relate to surface methane seeps, noise and odor, and land subsidence. Oil seeps from the Salt Lake oil field located beneath the Fairfax district caused a 1985 methane explosion at a clothing store, injuring over 20 people. Concern about the potential for future fire and explosions led the City of Los Angeles to impose requirements for methane venting and monitoring. That said these are relatively rare accidents and upset conditions.

This HIA evaluates potential health effects that could result from oil drilling and production activities in the City of Hermosa Beach according to the site-specific Project description (summarized in Section 1.3) and information provided in the Final EIR.

1.3 Project Description

The proposed Project consists of drilling 30 oil wells on a 1.3-acre site located on the current City Maintenance Yard property (the Site) located at 555 6th Street, at the intersection of Valley Drive and 6th Street in the City. The Site is bounded by industrial/commercial use properties to the north, south, and west. Commercial/industrial properties include Beach Cities Self Storage, Cypress Auto Body, A&B Heating, JB Plumbing, McGivern Surfboard Manufacturing, Buddhist Meditation Center, NUWORK (a recording studio), and other various small businesses. The Site is bounded by the Greenbelt, a park and recreational use space, to the east. Adjacent blocks also include residential uses located 150 feet to the north of the Project Site, 250 feet to the west and 180 feet to the east (east of the Greenbelt). The Pacific Ocean is approximately a half mile west of the Site. While the Site itself is relatively flat, the surrounding topography is rolling and varies due to underlying windblown sand dunes. The Site is currently the location of the City Maintenance Yard and the proposed Project would require relocation of the City Maintenance Yard to another property. The fenced and gated Maintenance Yard Facility includes two buildings, an office trailer, several equipment storage containers, a vehicle washout area, and a construction materials storage area. The Maintenance Yard location was used as a landfill from about 1927 to 1947, and an abandoned oil well is also on the Site. Figure 1-1 shows the Site location in relation to the public property, private property, and Pacific Ocean.

The proposed Project would involve the installation of underground pipelines to transport the processed oil and gas. The complete description of the proposed Project is provided in the Project Application and supporting documents (E&B, 2012; 2013a,b). Briefly, E&B (the Applicant) has stated the following objectives:

- Develop the proposed Project consistent with the 1993 Conditional Use Permit and the March 2, 2012 Settlement Agreement, with the use of directional drilling techniques from the Project site, which is the current City Maintenance Yard;
- Maximize oil and gas production from the Torrance Oil Field within the City's jurisdiction, thereby maximizing the economic benefits to the City;
- Provide an oil and gas development Project on the Site that utilizes the latest technology and operational advancements related to safety and production efficiency in order to provide a Project that would be safe and meet the applicable environmental requirements;

- Conduct construction and drilling activities on the Project Site incorporating technological advancements, operational practices, and design features related to air quality, odors, noise, hazards, and water quality to minimize the potential impacts on the adjacent community and the environment;
- Provide landscaping, hardscaping, signage, lighting, and other design features to minimize the visual effects of the proposed Project on the adjacent community; and,
- Implement operational practices and incorporate design features to provide safe vehicular ingress and egress during temporary construction activities and the ongoing operation of the proposed Project.

Figure 1-1 Proposed Project Location (Source: Project Application)

To accomplish E&B's objectives, the proposed Project would occur in four phases, as described below.

1.3.1 Phase 1 – Site Preparation and Construction (6 to 7 months)

The primary purpose of Phase 1 is to prepare the Site for drilling and testing, as well as the subsequent phases of the proposed Project. Construction activities include clearing and grading the Site, constructing retaining walls and the well cellar, installing fencing and electrical equipment, and placing existing overhead utilities underground. At this time, the City Maintenance Yard would be relocated to a temporary location. The most disruptive construction activities during this phase are expected to be demolition of existing infrastructure on the Site and construction of the well cellar. The erection of temporary 16-foot sound attenuation walls would reduce noise impacts related to construction. Construction activities will require trucks delivering and removing construction equipment to use designated truck routes in the cities of Hermosa Beach, Manhattan Beach, Redondo Beach and Torrance. Truck deliveries during all phases of the proposed Project would be limited to the hours between 9:00 am and 3:00 pm Monday through Friday, and limited to 18 round trips per day.

1.3.2 Phase 2 – Drilling and Testing (10 to 13 months)

This phase will involve drilling and testing of wells in order to estimate the potential productivity and economic viability of the proposed Project. Up to three wells and one water disposal/injection well (a total of four wells) would be drilled. The primary construction and drilling activities include installing a temporary trailer on the northeast corner of the site, setting up the drill rig and other production equipment, drilling the test wells, and operation activities. An electric drill rig will be used, reducing the need for diesel engines. The 87-foot high drill rig would operate for 24 hours per day, seven days per week for an estimated 120 days during this phase. Temporary lighting would be provided that would be shielded / hooded and directed downward. A 32-foot-high sound barrier wall would be constructed around the perimeter of the Site for the duration of all drilling activities. Processed oil from Phase 2 would be trucked to an offsite oil receiving facility in Torrance. If it is determined that the proposed Project is not economically viable, the Applicant would decommission installed equipment leaving the Site empty and available for future development or for the temporary City Maintenance Yard to move back to the Site. Conversely, if the project is found to be economically viable the City Maintenance Yard will be permanently relocated.

1.3.3 Phase 3 – Final Design and Construction (16 months)

If Phase 2 determines that the proposed Project is economically feasible, Phase 3 would be carried out to prepare the Site for permanent oil and gas production facilities and to construct offsite pipelines. After removing the temporary production equipment and the 32-foot wall from Phase 2 and preparing the Site for earthmoving activities, the Remedial Action Plan would be implemented to address residual metal and petroleum-contaminated soil and groundwater beneath the former landfill area in the northeastern portion of the Site. This phase would then involve construction of additional retaining walls and final grading, extending and completing the construction of the cement well cellar (to be approximately 8 feet wide by 120 feet long by 12 feet deep), placing a small office building onsite, installation of permanent production equipment, final Site and landscaping improvements, and erecting the 32-foot sound barrier wall for noise attenuation during Phase 4 drilling. The permanent oil production facility will include tanks, vessels, piping, pumps, filters and corresponding metering equipment. The Site will be paved and the facility will be designed in a manner to capture all liquids, including rainwater, in designated containment areas. Street improvements (e.g. new curbs, gutters, sidewalks) will be completed along 6th Street and Valley Drive.

The offsite underground pipeline for gas transport would be constructed to a tie-in point of receipt at a proposed metering station in the City of Redondo Beach (0.43 miles from the Site), and from there the gas company would construct a pipeline that extends for approximately 1.4 miles to an existing pipeline transmission facility in the City of Redondo Beach. Also during Phase 3, approximately 3.55 miles of underground pipeline for oil transport would be constructed to a tie-in at a valve box in Torrance along one of three proposed pipeline routes. Pipeline construction activities would occur on weekdays between 9:00 am and 3:00 pm, over a period of approximately 4 months during Phase 3. A depiction of the proposed pipeline routes can be found in the Final EIR Section 2, Figure 2.15. At the time of HIA preparation a preferred pipeline route had yet to be selected.

1.3.4 Phase 4 – Development and Operations (approximately 30 to 35 years)

Phase 4 will maximize oil and gas recovery through the construction of an 87-foot high drill rig, the drilling of the remaining oil wells and water disposal/injection wells through the continuous operation of the proposed Project. It is estimated that it will take two weeks to set up the drill rig, and two and a half years to drill the remaining wells, up to a total of 30 oil wells and four disposal/injection wells. Facility operations and maintenance would be continuous for approximately 30 to 35 years, with periodic re-drills during the life of the Project (averaging 30 days per years with a maximum of 150 days in one single year). Re-drilling of a well would occur if production from a well declines or if problems exist with the well. Re-drills would involve the same activities and equipment as all other drilling activities, including the use of a 32-foot sound attenuation wall. Over the life of the proposed Project, active wells would also require periodic maintenance, which will be accomplished by utilizing a 110-foot high “workover” rig (during weekdays 8:00 am to 6:00 pm only for a maximum of 90 days per year). The permanent production equipment would operate 24 hours a day, seven days per week.

The Site would be staffed 24 hours a day, seven days per week. At the end of the proposed Project, a separate permit process and CEQA environmental review would be required to decommission the Site.

2.0 HEALTH IMPACT ASSESSMENT INTRODUCTION AND METHODOLOGY

The World Health Organization (WHO) defines health as *"a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity"* (WHO, 1948). This definition is considered an ideal to strive for, and it forms the basic principle upon which HIA is based. Historically, community health has been a secondary consideration (if it is formally considered at all) in many policy/project decision making processes. When it has been included, it tends to be limited to an evaluation of health impacts associated with environmental contaminants. For this reason, HIA is intended to incorporate a wider range of potential health determinants. Often referred to as the 'social determinants of health' this collection of factors related to health status ranges from biological characteristics (i.e., age, gender, genetics, etc.) to socioeconomic factors (i.e., education, income, lifestyle factors, etc.) (Figure 2-1).

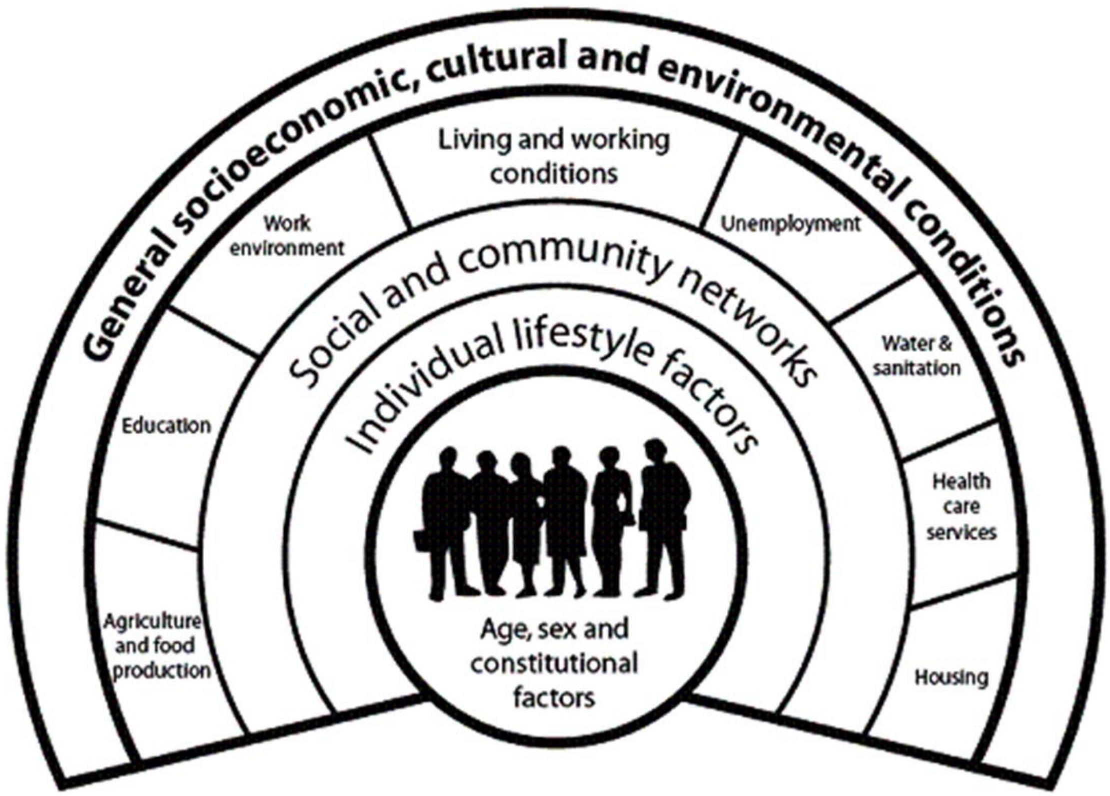

Figure 2-1 Social Determinants of Health (Whitehead and Dahlgren, 1991)

There are a number of ways that health (and its determinants) can be implicated from the execution of policy, program or project decisions. The complexities that surround each of these determinants and the interactions among them make it particularly difficult to predict the social impacts and associated health consequences of policy or project decisions. Despite this difficulty, social determinants are an important predictor of overall health and well-being, which is why the development and use of HIA has become increasingly prevalent in North America.

2.1 HIA Definition

There are many different definitions of HIA and no universally agreed upon methodology; although the basic purpose and approach are generally similar across international jurisdictions. The WHO (1999) defines HIA as:

> *"A combination of procedures, methods and tools by which a policy, programme or project may be judged as to its potential effects on the health of a population, and the distribution of those effects within the population."*

However, they note that there is no 'correct' definition of HIA since the definitions provided by various government and health agencies place emphasis on different aspects of the process. The National Research Council (NRC, 2011) provides a more prescriptive definition of HIA as:

> *"A systematic process that uses an array of data sources and analytic methods and considers input from stakeholders to determine the potential effects of a proposed policy, plan, program or project on the health of a population and the distribution of those effects within a population. HIAs provide recommendations on monitoring and managing those effects."*

Another useful definition that highlights the interdisciplinary nature of HIA and points out the quantitative and qualitative aspect of the process was published by Lock (2000):

> *"A structured method for assessing and improving the health consequences of projects and policies in the non-health sector. It is a multidisciplinary process combining a range of qualitative and quantitative evidence in a decision making framework."*

It is apparent from these and other definitions, that HIA is a process that has yet to be well defined in terms of specifics, although the general approach is consistent among jurisdictions. The recently released book "*Health Impact Assessment in the United States*" notes that although there is considerable variability, several key features appear across almost all definitions and tools (Ross et al., 2014):

1. Main purpose is to inform decision making;
2. Follows a structured but flexible process; and,
3. Examines the full range of relevant impacts to health (i.e., physical, social, etc.).

In addition, the North American HIA Practice Standards Working Group (2010), identified a minimum number of elements that must be included in an HIA in order to distinguish it from other processes. Accordingly, an HIA must:

- Inform the decision-making process around a proposed policy, program or project and be conducted prior to the decision being made;
- Employ a systematic analytical process that:

- Includes a scoping phase that fully considers potential impacts on health (including social, environmental and economic determinants) and identifies key issues for analysis;
    - Encourages and uses stakeholder feedback;
    - Establishes baseline health conditions;
    - Relies on the best available evidence to evaluate different aspects of the health impact (e.g., likelihood, magnitude, distribution, etc.); and,
    - Makes conclusions and recommendations based on a transparent and context-specific evaluation of the evidence while acknowledging the data sources, strengths and limitations of evidence, uncertainties and methodological assumptions.
- Identify appropriate recommendations (i.e., mitigation measures, design alternatives, etc.) to protect and promote health;
- Propose a plan to monitor/track the implementation with respect to the health determinants of concern; and,
- Include a transparent and comprehensive reporting process.

2.2 Purpose and Rationale for Conducting an HIA

Specifically, this HIA is intended to provide additional consideration of potential impacts (positive and negative) on health resulting from the proposed E&B Oil Drilling and Production Project in Hermosa Beach. A report produced jointly by Health Impact Project and Arizona State University (Sandra Day O'Connor College of Law) explored the purpose and legal basis for conducing HIAs in the United States. The report is entitled '*Legal Review Concerning the Use of Health Impact Assessments on Non-Health Sectors*' and it provides an overview of HIA legal provisions and requirements for HIAs in different jurisdictions. The authors of this report state that:

> *"HIAs incorporate a broad definition of health and employ a unique interdisciplinary methodology and input from people with a stake in the outcome of the decision to evaluate prospective effects on the social, economic, and environmental conditions that influence health due to governmental or private-sector policies, programs, and projects."*

Through a systematic review of the existing laws surrounding health considerations in decision-making, the authors concluded that there is a substantial legal basis in the U.S. to promote the use of HIA in conjunction with existing regulations. They point out that while HIAs are becoming more common in the U.S., they are still underutilized. They go on to state that *"the foundation provided by existing laws and policies creates important opportunities to factor health considerations into decisions made in non-health sectors using HIAs"* (Hodge et al., 2012).

In California, an HIA is not legally required for this type of project, but an Environmental Impact Report (EIR) is mandatory. In order to expand on existing health considerations in the EIR, the City of Hermosa Beach commissioned this HIA to help inform voters and evaluate different aspects of the proposed Project through a public health lens. The rationale for the HIA lies in its unique approach to assessing a multitude of potential impacts (both positive and negative) that could affect community health. The HIA is intended to provide additional information, as well as relying on existing information provided in the EIR, to holistically evaluate health. Although the reports are complementary, in several instances the HIA provides further details on how specific aspects of the Project could positively or negatively affect the health of the community, and proposes additional recommendations where necessary.

This HIA is not intended to be an advocacy tool for any particular group (whether opposed or in favor of the Project). Rather it is intended to provide further consideration of potential health outcomes using quantitative and qualitative tools to scientifically assess the potential for the Project to influence overall community health status.

2.3 Steps of an HIA

An HIA typically consists of a series of steps that are intended to provide a structural framework around which the assessment will be conducted. Although guidance documents from around the world have slight variations on these steps, the process is fundamentally the same.

Based on the recently published guidance document "*Health Impact Assessment in the United States*" (Ross et al., 2014), there are seven steps to conducting an HIA (Figure 2-2).

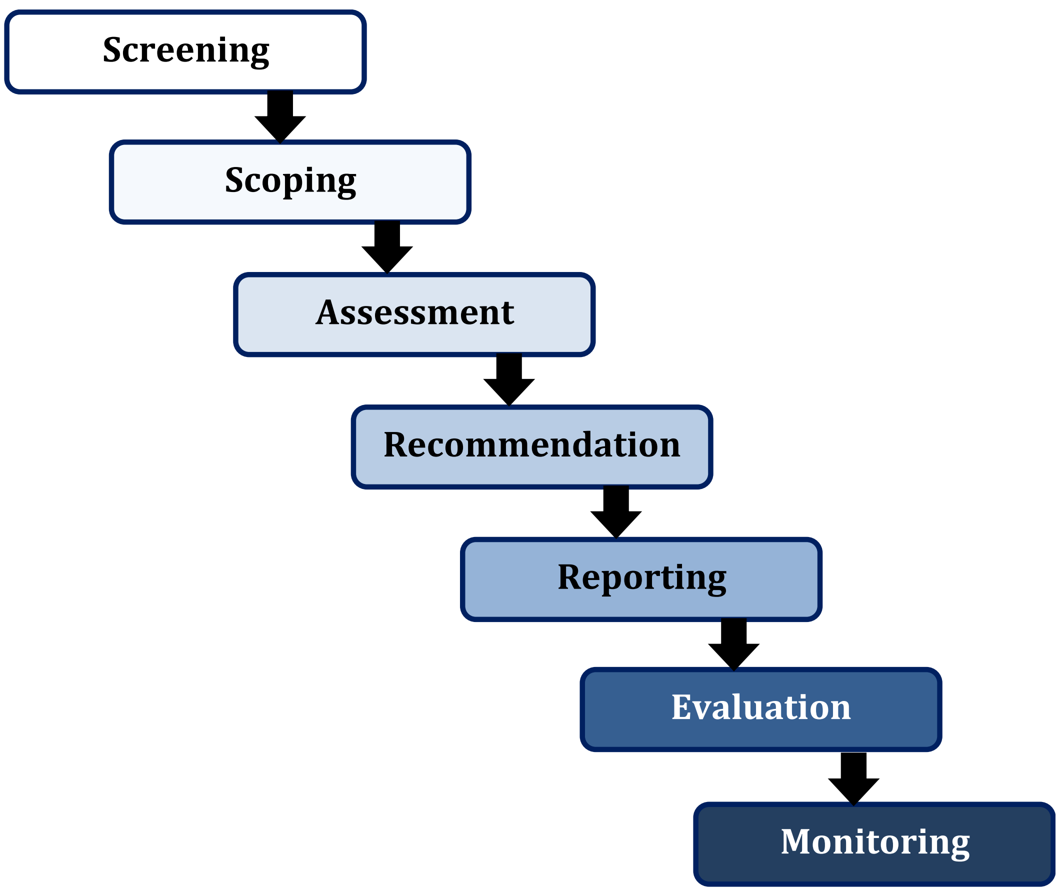

Figure 2-2 Steps of an HIA (Modified from Ross et al., 2014)

SCREENING: The first step of any HIA process is screening to determine whether this type of assessment is warranted based on a rapid review of available evidence (Ross et al., 2014). Key questions that are answered in this step include:

- Is an HIA needed?
- Is an HIA feasible and how much effort will be required?
- Are there other types of assessments that would be more appropriate?

According to Ross et al. (2014), screening involves:

> *" judgments about how an organization's resources should be used and whether the results of the HIA will contribute to stakeholder knowledge or the decision making process. In addition, screening can establish whether there are likely to be vulnerable populations or areas that need consideration and whether there are important community concerns that should be addressed."*

This step generally involves a rapid review of available evidence to determine whether the policy, program or project is likely to affect health determinants or health outcomes. In many cases; however, the decision to conduct an HIA is made before the HIA practitioners are involved; such as with the current Project.

SCOPING: The purpose of the scoping step is to plan the overall approach to the HIA including methods, contents and logistics (Ross et al., 2014). There is no single scoping protocol that fits all types of projects; however, there is general consensus around what aspect of the HIA should be planned. The main issues to be addressed typically fall in to three categories:

1. <u>Management of the HIA</u>: initiating the process to ensure that the results are included in the decision making process and that the HIA will move forward with sufficient time and resources.
2. <u>Scope of the HIA</u>: scoping the HIA such that the issues of highest priority (based on established evidence and community input) are included along with identification of the assessment population/area.
3. <u>Methodological Approach of the HIA</u>: identifying the major sources of information required for the HIA and determining how the evaluation and analysis will be conducted, including a communication plan for stakeholder engagement.

ASSESSMENT: The assessment step is where all of the planning in the scoping phase is carried out to "*identify whether impacts are likely to occur and then to quantify or characterize the predicted impacts*" (Ross et al., 2014). Assessments typically consist of both quantitative methods of analysis, where applicable, and qualitative evaluations and discussions. The assessment process varies widely depending on the project specifics; however, there tends to be specific steps involved in carrying out the assessment part of an HIA (Ross et al., 2014):

Step 1: Develop a health baseline or community profile

This step typically involves finding and compiling data on existing health conditions within the population or area of interest. This baseline assessment allows for identification of health challenges and opportunities, possible vulnerabilities, and establishment of current health status as a reference point from which to conduct the assessment.

Step 2: Assess the likely impacts

The purpose of the assessment (also described as appraisal or analysis) is to predict what health effects could occur as a result of the proposed project or policy, identify the extent of the effects, and determining how different groups could potentially be impacted (e.g., children vs adults, specific neighborhoods or groups, etc.). This should be done using the best available evidence and can include: systematic reviews and meta-analyses; peer reviewed literature; government agency reports and other reputable gray literature; previously published HIAs, quantitative models, expert opinion and stakeholder input.

Step 3: Characterize/summarize the health impacts

Finally, it is important to provide a summary of the evaluation of predicted impacts (positive and negative) so that they can be compared and contrasted. This is especially important when the HIA is to be used as a component of the decision-making process, because it enables decision makers to quickly see which potential health impacts are of more or less concern. It allows for the HIA to be meaningfully integrated into evaluating the proposed project/policy since decisions can be made based on these findings (e.g., mitigation measures, monitoring, etc.).

RECOMMENDATIONS: Based on the findings of the assessment, specific recommendations may be made with respect to any identified health impacts and should include input from key stakeholders to ensure they are politically, socially and technically feasible. According to Ross et al. (2014):

"Recommendations are specific action items that describe how conditions should be amended in order to minimize the predicted adverse impacts of the proposed project or policy and to maximize potential benefits. The development of recommendations is a critical step of health impact assessment (HIA) because it provides an opportunity to translate the results of the assessment into actions that may improve the health of the affected population."

REPORTING: The process of completing an HIA (including screening and scoping steps) are typically written up in a report-style format to be distributed to interested and involved parties (i.e., decision-makers, special interest groups and other stakeholders, health authorities or other government bodies, the media, etc.). Reporting can be difficult because different interest groups will prefer that the information be presented in different ways. For example, key policy or decision makers may want a detailed formal report, whereas the media and the public may prefer a concise and plain language summary of key findings.

EVALUATION: Evaluation is considered an important aspect of HIA since it involves reflection and critical assessment of the process in order to foster improvement. Although not included in all HIAs, it can be a valuable step in the process because it allows for reflection on the HIA process, its role in the decision-making and any outcomes that were influenced as a result of the findings. The evaluation step can demonstrate the effectiveness of HIA in the planning process by showing what the HIA actually achieved. It is essentially a method to allow practitioners to reflect on the process and make changes to their approach, which will foster continuous improvement of HIA in the future.

MONITORING: Monitoring is often combined with evaluation since they are similar concepts but with different objectives. In their book, Ross et al. (2014) separate out monitoring from evaluation and state:

> *"The purpose of monitoring is to track the health impact assessment (HIA) and its effect over time. The monitoring process can be envisioned as a system of checks and balances to ensure accountability in the implementation of the HIAs recommendations and to gauge compliance with regulations."*

Monitoring is one of the least well-defined steps of HIA. When an HIA recommends monitoring it is generally in the form of requesting testing or data collection over time to ensure that mitigation and control measures (that were either relied upon in the HIA or recommended as a result of the HIA) are operating effectively and to observe health implications over time.

2.4 HIA Evaluation Matrix

An HIA evaluation matrix is a tool to characterize and summarize the predicted health impacts (positive, negative, and neutral) of the proposed Project so they can be compared and contrasted. As there is no globally accepted standard for health impact characterization in HIA, the evaluation matrix used in this HIA was developed based on best practices published in a number of guidance documents and used in other assessments (Ross et al., 2014; USEPA, 2013; CDPH, 2010; IAIA, 2006; NRC, 2011).

The HIA is founded on the idea that commercial and industrial developments undoubtedly impact people living or working in their vicinity. In HIA it is important to distinguish between the directionality of these impacts (i.e., positive, negative, and neutral) and consider the nature and extent of various types of effects on health.

The evaluation matrix developed for this HIA includes consideration of the different characteristics of potential impacts including geographic extent (local, widespread), vulnerable populations, magnitude, likelihood of occurrence, and others. Each of these characteristics is independently evaluated based on data from the EIR, evidence from the scientific literature, and professional judgment. A brief discussion of the Project without mitigation measures will be included where applicable. However, the Project characteristics are ultimately evaluated based on a scenario where the proposed EIR mitigation measures have been implemented. This is because once the EIR is certified the mitigation measures must be adhered to. Further, the HIA is intended to quantitatively and qualitatively assess those conditions in which the community will be living and working following Project approval and initiation. Evaluating a scenario that does not exist would produce results that are prone to misinterpretation and not helpful to decision makers and the public. Rather, the assessment focuses on the Project including mitigation measures to ensure they are adequately protective and, if not, to propose additional recommendations based on the HIA findings.

The evaluation criteria are discussed in further detail below (Table 2-1).

Table 2-1 HIA Evaluation Matrix

Health Determinant	List the determinant being assessed
Potential Health Outcome	List potential health outcomes associated with each determinant
Pre-Mitigation Discussion	The discussion is limited to identification of the direction of the pre-mitigation impact (positive, negative, neutral or unknown) and identification of any potential issues that could arise if no mitigation measures were implemented.
EIR Mitigation	List mitigation measures from the Environmental Impact Report (EIR), where applicable
Geographic Extent	Localized or Community
Vulnerable Populations	List subgroups that could be disproportionately affected (positively or negatively) by Project activities
Magnitude	Low, Medium, High, or Unknown
Adaptability	High, Medium, Low, or Unknown
Likelihood	Unlikely, Possible, or Probable
Post-Mitigation Health Effect	Negative, Positive, No substantial Effect, or Unknown
Comments or Additional Recommended Measures	None, or Additional Recommendations (specific and actionable)

For each health determinant evaluated in the HIA, a technical scientific assessment of the potential health impact will include a detailed discussion of all aspects of the evaluation matrix. A specific definition has been provided for each element (i.e., magnitude, adaptability, likelihood, etc.) to ensure a consistent and meaningful assessment across all determinants.

Health Determinant: A determinant is defined as "*an element that identifies or determines the nature of something*". In this case, the determinant is an element of the proposed Project that has the potential to impact health in a positive or negative manner; however, the determinant itself is non-directional. The scoping section of the HIA identifies health determinants that are evaluated in detail.

Potential Health Outcome: List and discuss potential health outcomes associated with the determinant (e.g., the toxicology and physical health changes associated with exposure).

Pre-Mitigation Discussion: A brief discussion of the potential impact of the Project without mitigation is provided for completeness; however, the HIA is based only on a scenario where the mitigation measures required in the EIR have been implemented as part of the Project. The discussion is limited to identification of the direction of the pre-mitigation impact (positive, negative, neutral or unknown) and identification of any potential issues that could arise if no mitigation measures were implemented.

EIR Mitigation: What are the mitigation measures that have been identified in the EIR for this determinant that are related to health and could change the outcome of the HIA? Measures are listed based on information provided in the Final EIR.

Geographic Extent: How far are the impacts likely to reach?

- Localized: limited to the areas in close proximity to the Project Site
- Community: potential for wider scale impacts across the community

Vulnerable Populations: Are there populations that could be disproportionately affected (positively or negatively) by Project activities?

Magnitude: What is the extent of the health impact post-mitigation?

- Low: the impact is minor, it is temporary or reversible, and does not pose a hazard/benefit to health
- Medium: the impact is detectable, it is reversible, and poses a minor to moderate hazard/benefit to health
- High: the impact is substantial, it is permanent, and poses a major hazard/benefit to health
- Unknown: the impact is unclear and poses an unknown hazard/benefit to health

Adaptability: How resilient is the community to this type of change; are they able to adapt?

- High: people will be able to adapt to the change with ease and maintain pre-project level of health
- Medium: people will be able to adapt to the change with some difficulty and will maintain pre-project level of health, although some support may be necessary
- Low: people will not be able to adapt or maintain pre-project level of health

Likelihood: What is the probability of the impact occurring based on the expected frequency of the exposure?

- Unlikely: the impact is anticipated to occur rarely, if ever
- Possible: there is potential for the impact to occur on a regular basis
- Probable: the impact will almost certainly occur and persist over time

Post-Mitigation Health Effect: What is the 'direction' of the post-mitigation effect?

- Positive: the effect is expected to positively influence health following implementation of EIR mitigation measures

- Negative: the effect is expected to negatively influence health following implementation of EIR mitigation measures
- No Substantial Effect: there is no substantial health effect expected following implementation of EIR mitigation measures
- Unknown: the direction of the effect following implementation of EIR mitigation measures is unknown

Comments or Additional Recommended Measures: Provide comment about the effect, and/or determine if there any additional measures recommended based on the Post-Mitigation Health Effect.

- None: there are no additional measures recommended based on the findings of the HIA
- Additional Recommended Measures: there are additional measures recommended based on the findings of the HIA (provide brief summary of recommendations)

The decision-making framework (the framework) used to weigh and evaluate each of the elements of the evaluation matrix in order to come to a final conclusion on "Post-Mitigation Health Effect" for each health determinant is provided in Figure 2-3. The elements (i.e., magnitude, adaptability and likelihood) are arranged in descending order (top to bottom) of weight and potential influence on the final determination of effect. Each pathway through the framework leads to a specific conclusion that is either directional (i.e., positive or negative) or non-directional/neutral (i.e., no substantial effect). In some cases where professional judgment dictates, it is possible to deviate from the decision making framework; however, a detailed evidence-based rationale is required to be provided in the accompanying text.

The evaluation matrix is the tool that was used to classify and weigh different aspects of potential impact resulting from Project activities. The impacts that have been evaluated as part of this HIA were classified by their geographic extent, magnitude, adaptability and likelihood. The geographic extent, although important in identifying the physical reach of possible impacts, is not weighted in the evaluation matrix in a way that would influence the final conclusion (i.e., positive, negative or no substantial effect). Rather, geographic extent is used to identify potentially impacted populations, as well as informing and targeting any necessary mitigation measures. Vulnerable populations were also included as part of the assessment and the potential for disproportionate impacts on these individuals was carefully considered in the classification of magnitude and adaptability. They were also taken into account when making additional recommendations.

There are three potential outcomes used to classify a health effect. The classification is based solely on the definitions provided above and is intended to describe the extent of the post-mitigation health impact. The most heavily weighted aspect of the evaluation matrix is magnitude, which comprises the first level of the framework. Adaptability is the next level of the evaluation matrix as it relates to resiliency and ability to maintain health status if an impact were to occur. This element is less heavily weighted than magnitude but does influence the final determination of effect. The final level of the matrix is likelihood, which is the probability of the impact occurring based on the expected frequency of exposure. Likelihood is less heavily weighted than magnitude but similar to adaptability, it influences the final conclusion, especially in situations where the impact is expected to occur rarely, if ever. Where an element of the evaluation matrix is classified as ‘unknown’ a discussion of the uncertainty and potential influence of this limitation on the conclusions must be provided. In these scenarios, the determination of effect is largely based on professional judgment and sound rationale.

In order to come to a final conclusion regarding the potential for a Post-Mitigation Health Effect, the health determinant being assessed must be classified as to its magnitude (high, medium, low), adaptability (low, medium, high), and likelihood (unlikely, possible, probable). For example, if for a specific health determinant the impact is detectible, reversible and poses a minor to moderate hazard to health, the magnitude would be classified as ‘medium’ moving down the center pathway in the framework (Figure 2-3). Then, if people are able to adapt to the change with ease and maintain a pre-project level of health, adaptability would be classified as ‘high’. Finally, if the impact is anticipated to occur rarely, if ever, then the likelihood would be identified as ‘unlikely’ and the corresponding pathway in the framework would lead to a no substantial effect (i.e., neutral) conclusion for the posit-mitigation health effect.

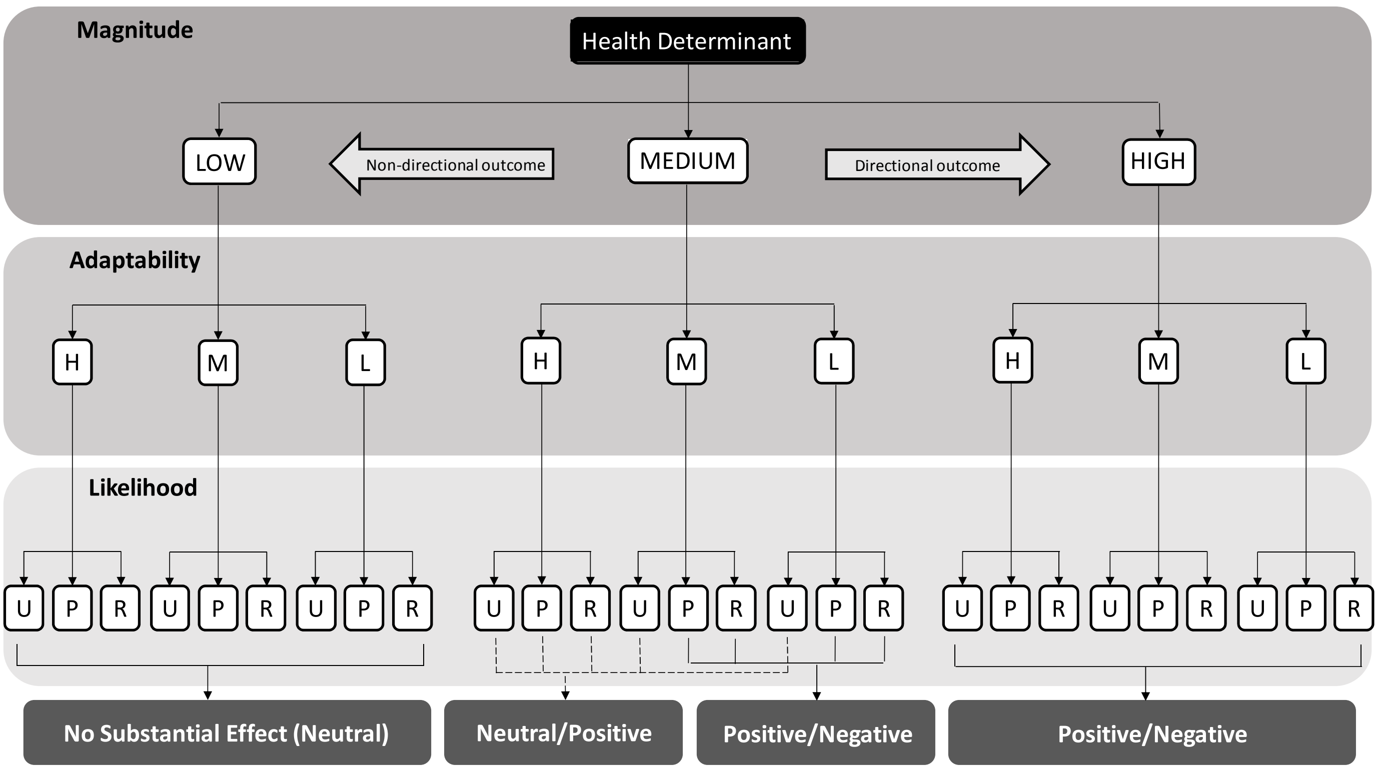

Figure 2-3 Decision-Making Framework for the HIA Evaluation Matrix (H = high; M = medium; L = low; U = unlikely; P = possible; R = probable)

3.0 SCREENING

The primary objective of the screening step is to determine whether an HIA should be conducted and to begin defining specific objectives by considering potential Project-related health impacts. The overall goal of this HIA is to identify and evaluate potential health impacts (both positive and negative) associated with the proposed E&B oil drilling and production Project. The HIA is also intended to provide a better and more holistic understanding of the likelihood, magnitude and extent of potential health impacts.

The City of Hermosa Beach is committed to communicating the findings of the HIA prior to the vote on the proposed Project in order to facilitate the decision-making process. The availability of existing regulatory frameworks to evaluate health impacts is also taken into consideration when determining the need for an HIA. The proposed E&B oil drilling and production Project is subject to regulation under the California Environmental Quality Act (CEQA), which requires an EIR. Consequently, the HIA is not intended to be a stand-alone document; rather it is complementary to the existing information provided in the EIR. The difference lies in the scope of the health impacts considered, with HIA focusing on a wider range of health determinants including social and economic aspects which may not have been addressed in the EIR, or may not have focused on human health implications of Project activities. The purpose of this HIA is to provide a focused and context-specific evaluation of aspects of the Project that could have a positive, negative or neutral impact on community health.

The proposed oil and gas Project in the City of Hermosa Beach has generated considerable controversy. At an Open House in September 2013 and a public meeting in October 2013, residents expressed a variety of concerns about the potential health impacts of the proposed Project. Health concerns raised by members of the community included:

- **Physical** – hazards resulting from accidents, malfunctions and emergencies
- **Environmental** – adverse impacts to the quality of air, water, soil, or food
- **Socioeconomic** – impacts to community resources
- **Psychological** – mental health impacts
- **Other** – cumulative effects, political stress of the decision-making process

The questions and comments received from members of the public regarding these health topics reinforced the City's decision to include an HIA in the assessment process. Therefore, it was determined that conducting an HIA on the proposed Project would add value and serve to highlight health considerations within the decision-making process. The residents of Hermosa Beach will be voting on whether to lift the ban on oil drilling and will have information from the HIA, EIR and CBA available to inform their decision.

4.0 SCOPING

The scoping step for this HIA was conducted based on the Guide for Health Impact Assessment (CDPH 2010), which outlines the process for identifying priority issues, research questions and methods. Additional guidance documents used in the development of this HIA include the 'Technical Guidance for Health Impact Assessment in Alaska' (2011), which specifically addresses the evaluation of potential impacts from proposed oil and gas development projects, and the recently published 'Health Impact Assessment in the United States' (Ross et al. 2014), which is an up to date publication featuring example case studies. Lastly, tools and resources provided by Human Impact Partners, a nationwide organization dedicated to building the capacity of HIAs, supplemented the scoping process through its searchable database of scientific articles on social, economic and environmental determinants of health.

Since the proposed Project has the potential to influence a range of health outcomes in the community, a comprehensive scoping checklist that considers the likelihood and magnitude of impacts was used to initiate this step (Appendix B). Through stakeholder participation, and a review of the scientific evidence surrounding potential health impacts, this list was further refined.

4.1 Stakeholder Engagement

Stakeholder engagement is a key component of an HIA and is particularly useful in the scoping step. Community participation and expert consultation ensure that the most important issues and local knowledge are included in the analysis. The relevant stakeholders identified in this HIA include:

- The decisions-makers (voting public of Hermosa Beach);
- Local government (City of Hermosa Beach);
- Non-residents who work, recreate, or otherwise spend time in Hermosa Beach;
- Pro-oil and anti-oil activist groups (e.g., Keep Hermosa Hermosa, Protect Hermosa's Future);
- The Project Applicant E&B Oil Company; and,
- Local health agency (Beach Cities Health District).

The HIA team attempted to reach out to all stakeholders throughout the HIA process. The exception was E&B representatives, whom the HIA team did not interview while undertaking this project. Specific opportunities for stakeholder involvement included:

- A Community Dialogue process, sponsored by the City, to identify the values and long-term goals for Hermosa Beach. A series of workshops were conducted in small groups to engage local residents and business owners in describing priorities and building a framework for decision-making. The HIA team participated in, and coordinated with, the Community Dialogue process to incorporate key quality of life aspects identified by Hermosa Beach community members into the evaluation of overall community health and well-being.

- A public Open House was held on July 13, 2013 to introduce the concept of HIA and kick-off stakeholder involvement. The Open House was held on a weekend from 9 am to 2 pm in the Community Center located in the center of town.
- An HIA scoping meeting was held on September 23, 2013 to elicit community feedback regarding potential health concerns of interest. The HIA public scoping meeting was held on a weeknight from 7 pm to 10 pm at the Community Theater also located in the center of town. To accommodate those who were unable to attend in person, the scoping meeting was broadcast on a local television station and the videotape posted on the City website. Following the scoping meeting, public comments (both written and oral) were received and are available on the City's website (http://www.hermosabch.org/). The scoping meeting was facilitated by City Staff and was well-attended (approximately 400 people).
- One-on-one interviews with community members
- Two presentations of the initial draft HIA findings, February 24th 26th from 6:30 pm to 10 pm in the Community Theater.
- The public and peer review comments received on the initial draft HIA, and responses, are included in Appendix C. The public comments on the reissued draft HIA in July 2014 are also included in Appendix C.

All public opportunities for engagement were advertised to the community via multiple outlets including postcard mailers, announcements in the local newspaper, banners in public spaces, and e-mail blasts to the City mailing list.

In addition to feedback from the public meetings, an online survey was conducted to help identify the key issues of concern among community members. The survey was announced at the scoping meeting, and the link was posted on the City's website. The survey consists of four multiple choice questions asking where respondents live, whether there is concern about health impacts of the proposed Project, what potential health impacts are of most concern, and if the level of concern depends on the various Project phases. A copy of the survey is provided in Appendix D. A total of 292 community members responded. The majority of the survey participants live in Hermosa Beach near the Site of the proposed Project (South of Pier Avenue and West of Pacific Coast Highway, Figure 4-1).

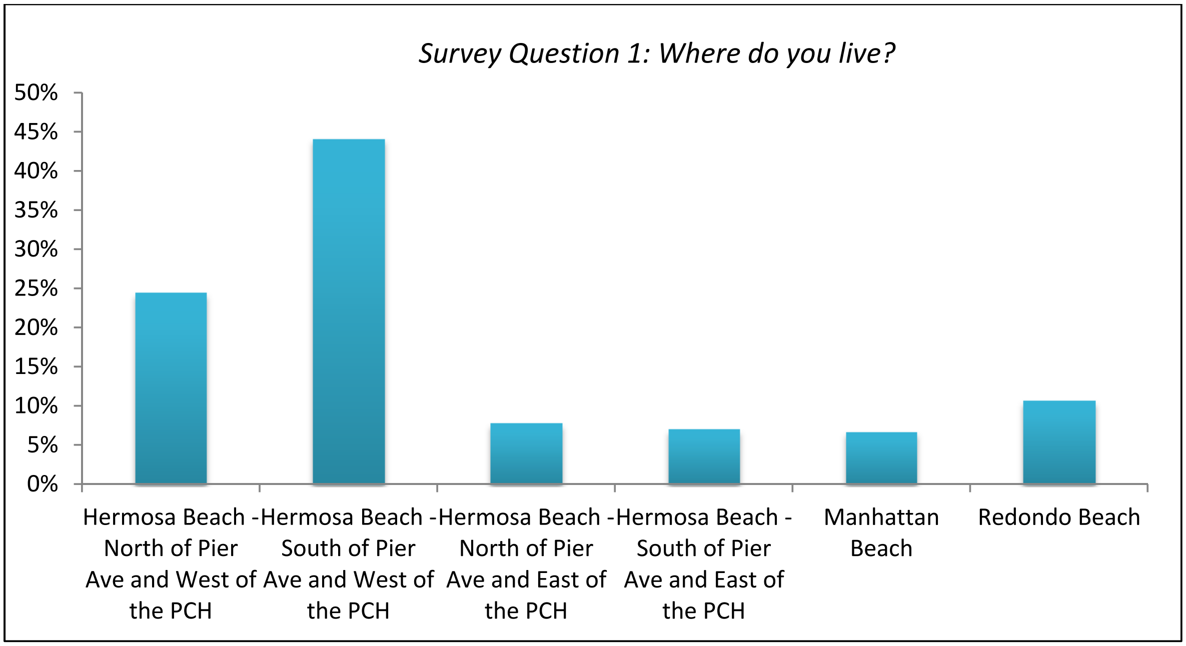

Figure 4-1 Distribution of Survey Participants Place of Residence

Of the 292 survey participants, 93% were either very or somewhat concerned about the potential health impacts of the proposed Project. The remaining 7% of participants were either not concerned about potential health impacts or are not sure. Survey participants ranked their level of concern for 18 topics as “very concerned”, “somewhat concerned”, “not concerned” or “no opinion”; participants were also given the option to specify “other” concerns. Overall, survey respondents appeared to be concerned about potential health and environmental impacts (responses of “I am very concerned” ranged from 62% to 89% for individual topics). Table 4-1 ranks the concerns of respondents in order of greatest concern (based on the rating average). Issues of most concern included explosions/spills, impacts to the ocean or beach, soil contamination, air quality, odor and surface water contamination. Although some members of the community were very concerned about all of the topics - vibration, parking and light problems ranked lowest in terms of overall level of concern. A total of 73 survey participants also specified other areas of concern that are not listed in Table 4-1 (e.g., hydrogen sulfide, cancer, traffic accidents, and sensitivity of children to environmental exposures). The complete list of survey responses is included in Appendix D.

The last question of the survey asked if the level of concern differs based on the phase of the proposed Project. The responses reflected a higher level of concern associated with both drilling phases – Phase 2 and Phase 4. Comparatively, the survey respondents were less concerned with the construction phases, Phase 1 and 3. Where applicable, the assessment (Section 5) discusses the potential for impacts in the different Project phases.

Table 4-1 Ranking of Environmental and Health Areas of Concern

Answer Options	Very concerned	Somewhat concerned	Not concerned	No opinion	Rating Average
Explosions/Spills/Accidents	254	23	6	1	1.13
Potential impacts to the ocean	259	16	10	1	1.14
Soil contamination	249	27	8	1	1.16
Air quality issues	247	26	9	1	1.17
Odor	248	25	8	2	1.17
Surface water contamination	244	22	11	3	1.19
Truck traffic	230	45	6	2	1.22
Drinking water contamination	234	30	15	4	1.25
Property values	223	33	19	4	1.3
Noise	220	39	21	3	1.32
Land subsidence (sinking)	212	43	16	6	1.34
Less access to community spaces	210	51	16	5	1.35
Earthquakes	207	55	20	2	1.36
Image of the City	210	41	24	4	1.36
Vibration	204	47	25	6	1.41
Parking problems	195	58	23	6	1.43
Lights	177	63	32	6	1.52

The online survey was a convenient way to facilitate public input into the scoping process while minimizing time and expense associated with traditional survey techniques. However, we recognize that the informal online survey precluded the recruitment of a representative sample of the population. Because the survey was one method, among others, to gather input from the community and no scientific conclusions are made with the results, the fact that the respondents do not constitute a representative subsample of the population is not considered to be a significant limitation of the HIA.

It is believed that all interested members of the public and stakeholders were reached during the HIA, given the extensive outreach and consultation efforts undertaken.

4.2 Pathways

A complex interplay of genetic, environmental and lifestyle factors determines the health of individuals and communities. Environmental exposures can influence community health but so can individual behaviors, social networks, living conditions and cultural practices. Therefore, determinants of health include social and economic elements, in addition to the physical environment and individual characteristics and behaviors. There are many models that have recognized the social-economic influences on health, including that provided by the federal government's national health objective, Healthy People 2020 (Figure 4-2).

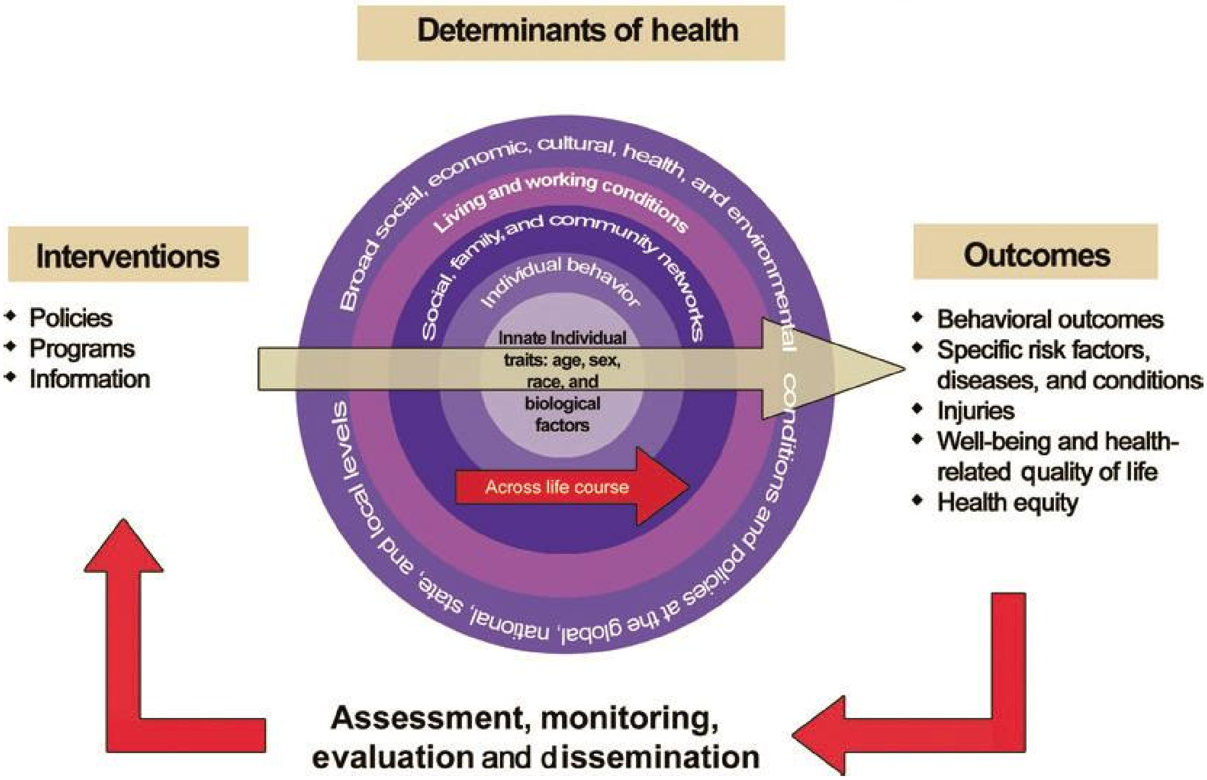

Figure 4-2 Social Ecological Health Framework (USHHS, 2008)

In order to facilitate the scoping process, pathway diagrams were created to understand the potential health impacts (positive and negative) of approving the proposed Project. Considerations included potential changes in social, economic, physical, psychological and other health-related quality of life outcomes. Public input and a review of other oil and gas development projects in the Los Angeles area were used to further refine the areas of health focus for this evaluation. Due to the large variety in designs for oil and gas development projects, a professional engineer with over 15 years of experience in the oil and gas industry was consulted to provide expertise on the engineering features of the proposed project as described in the E&B Project application (2012; 2013a,b). Additionally, key case studies and scientific review articles of health assessments related to oil and/or gas development were taken into consideration during the development of pathways for this HIA, including:

1. Northeast National Petroleum Reserve – Alaska Final Supplement Integrated Activity Plan/Environmental Impact Statement (BLM, 2008)
2. Health Impact Assessment for Battlement Mesa, Garfield County Colorado (U of C, 2010)
3. Inglewood Oil Field Communities Health Assessment (LACDPH, 2011a)
4. Health Impact Assessment of Shale Gas Extraction (NAP, 2013)

Health determinants were prioritized based on a combination of key issues identified by community members, health research published in scientific peer-reviewed journals and professional experience. Based on a combination of public input, expert consultation, and a review of available scientific evidence, the following pathways were selected for further evaluation in the HIA:

- Air Quality;
- Water and Soil Quality;
- Accidents and Upset Conditions;
- Noise and Light;
- Traffic; and,
- Community Livability.

The relocation of the City Maintenance Yard was not evaluated in the HIA. This is because its proposed relocation will be to a site with existing commercial land use (i.e., storage facilities). The construction and relocation of the City Maintenance Yard is not anticipated to be substantially different than other common local construction projects and is identified in the EIR as a separate Project. Therefore, the relocation activities were considered to be outside the scope of the HIA.

In addition, the HIA did not evaluate the "No Project Alternative", as presented in the EIR. This scenario was an evaluation of a condition under which no development of the oil and gas resources would occur. "*There would be no drilling and no construction at the Project Site or along Pipeline routes. The City maintenance Yard would not be relocated and rebuilt. None of the impacts associated with the Proposed Project would occur. No new impacts would occur under the No Project Alternative*" (MRS, 2014). This is clearly illustrated in the Executive Summary of the EIR in Table ES.3 (MRS, 2014). This scenario was not evaluated in the HIA as there would be no deviation from baseline health.

4.2.1 Air Quality

In the project description, E&B stated that its proposed oil and gas development facility will utilize the latest technology and operational advancements in order to reduce potential impacts on air quality. The specific measures are outlined in the EIR and include an automatic drill rig powered by electricity (as opposed to diesel), limiting the number of truck trips to and from the Site, and air monitoring activities. This HIA relied on pollutant inventory data from the EIR and evaluated a number of different air pollutants that could be emitted from three primary sources: construction, truck traffic, and operations (Figure 4-3).

As with any new development, emissions from project construction have the potential to impact the surrounding community. Construction equipment and the vehicles that transport equipment release fine particulate and diesel particulate matter into ambient air. In some circumstances, increasing the number of on-road vehicles can cause traffic congestion, and increase the risk of traffic injury to motorists, pedestrians and bicyclists (Section 5.6). In addition to emissions from the internal combustion engines of construction equipment, soil excavation and movement during construction activities generate dust (Section 5.3.2.).

Emissions during oil production operations (including testing, drilling and production phases) could potentially impact local air quality, particularly without any air pollution controls or mitigation measures. The emission sources associated with operational activities include onsite microturbines used to generate onsite electricity, routine and emergency flaring events, and volatile fugitive emissions from valves, compressors, pumps and connections. Muds that contain hydrocarbons can surface and release hydrocarbon vapors (referred to as "mud off-gassing"). Drilling muds may contain hydrogen sulfide, benzene and other volatile compounds, which could potentially impact health if they are released in sufficient quantities. Additionally, hydrogen sulfide and hydrocarbon vapors could leak into ambient air producing detectable odors. Due to the close proximity of the site to neighbors, businesses and the public (within 100 feet of businesses, 160 feet of residences and 20 feet of the public sidewalks), there is potential for odor issues off-site including various maintenance activities, small spills, and leaks from equipment components.

A significant body of scientific and public health literature exists that describes the association between excess levels of ambient air pollutants and certain health outcomes, specifically respiratory and cardiovascular disease. It is important to note that these effects are dose-dependent, in other words, the mere presence of a chemical does not mean that exposure will result in adverse health effects. The literature also identifies the potential impacts that odors can have on quality of life and, at high enough levels, acute health risks.

The air quality pathway diagram in Figure 4-3 summarizes the *potential* health effect pathways between the proposed Project and health outcomes in the event that exposures were uncontrolled. It should be noted that this diagram, developed during the scoping step, is a preliminary effect pathway diagram. The next step in the HIA is the assessment step, which validates or invalidates each potential pathway.

In the first Draft of the HIA the potential health outcomes of greenhouse gas generation from the Project were briefly evaluated. However, the authors of the reissued draft HIA Report do not believe that localized or community health effects related to potential greenhouse gas emissions can be adequately evaluated in a project-level HIA. Rather, the global issue of greenhouse gas generation requires a much broader assessment of state and national sources and policies to adequately evaluate cumulative impacts of the energy sector.

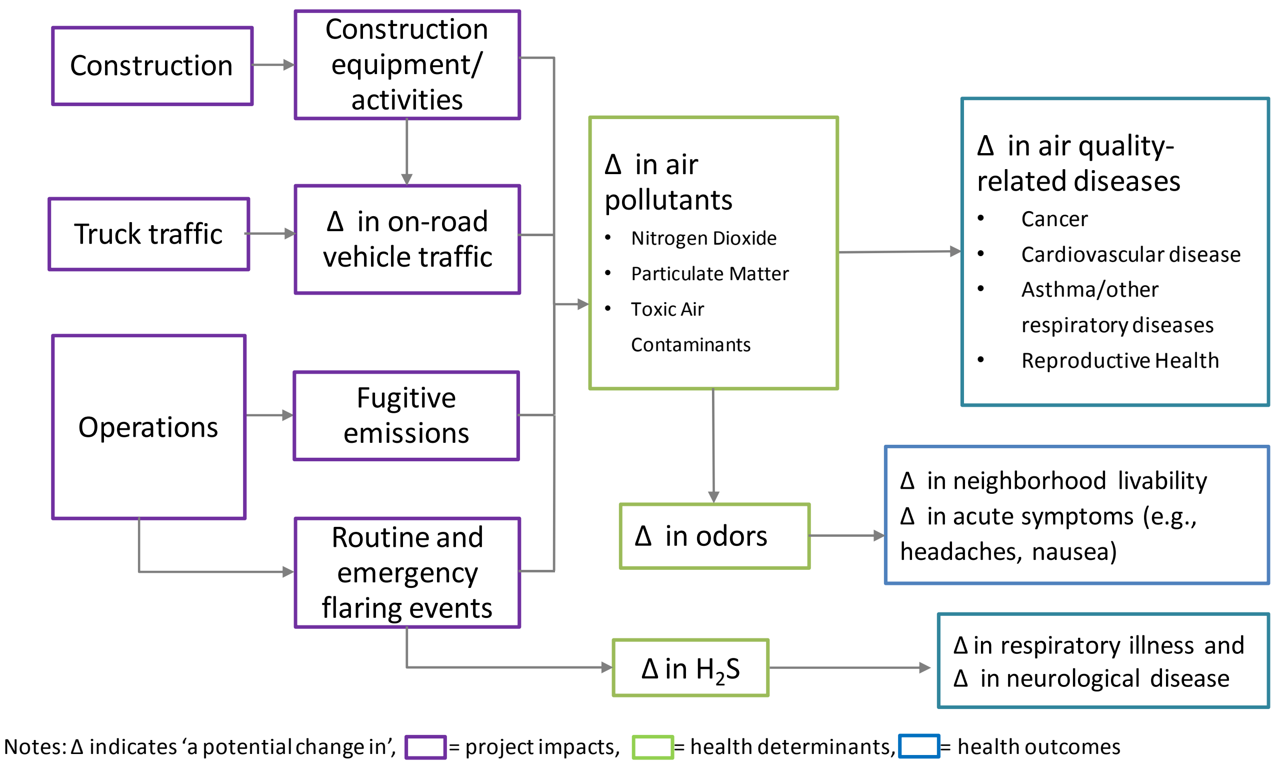

Figure 4-3 Air Quality Pathway Diagram

4.2.2 *Water and Soil Quality*

Two potential sources of water and soil quality impacts were identified in the scoping phase: (1) discharge of wastewater and surface water runoff during construction and operations, and (2) deposition of windblown soil particulates to offsite surface soil. The primary water resource located near the Site and pipeline route is the Pacific Ocean. The ocean provides a potential exposure pathway for recreational users to come into contact with contaminants from the Site. There are no other surface water bodies in the vicinity of the proposed Project.

Soil particulate emissions refer to the dust generated during construction and operations when equipment moves over soil or unpaved surfaces during trenching, grading, and other earth-moving activities. The public may be exposed to contaminated materials if contamination is present in soil and is mobilized during dust-generating activities. Adjacent land uses that could potentially be impacted by soil particulates include commercial, residential and recreational areas.

Groundwater was not included in the scope of the HIA because it was ruled out as a pathway for human health concern. Most of the groundwater in the West Coast Basin remains at an elevation below sea level due to historic over-pumping; therefore, seawater intrusion barriers have been established. The groundwater located beneath the Site lies to the west of the barrier that prevents seawater intrusion into fresh groundwater supplies. As groundwater is within the seawater intrusion barrier, it is not used as a drinking water source. While groundwater is not a drinking water source, and not evaluated in the HIA, it is still a protected resource. Potential impacts to groundwater quality due to Project wastewater generation are addressed in Section 4 of the EIR.

The water and soil pathway diagram in Figure 4-4 summarizes the *potential* health effect pathways between the proposed Project and health outcomes in the event that exposures were uncontrolled. It should be noted that this diagram, developed during the scoping step, is a preliminary effect pathway diagram. The subsequent step in the HIA, the assessment step, generates evidence to validate or invalidate each potential pathway.

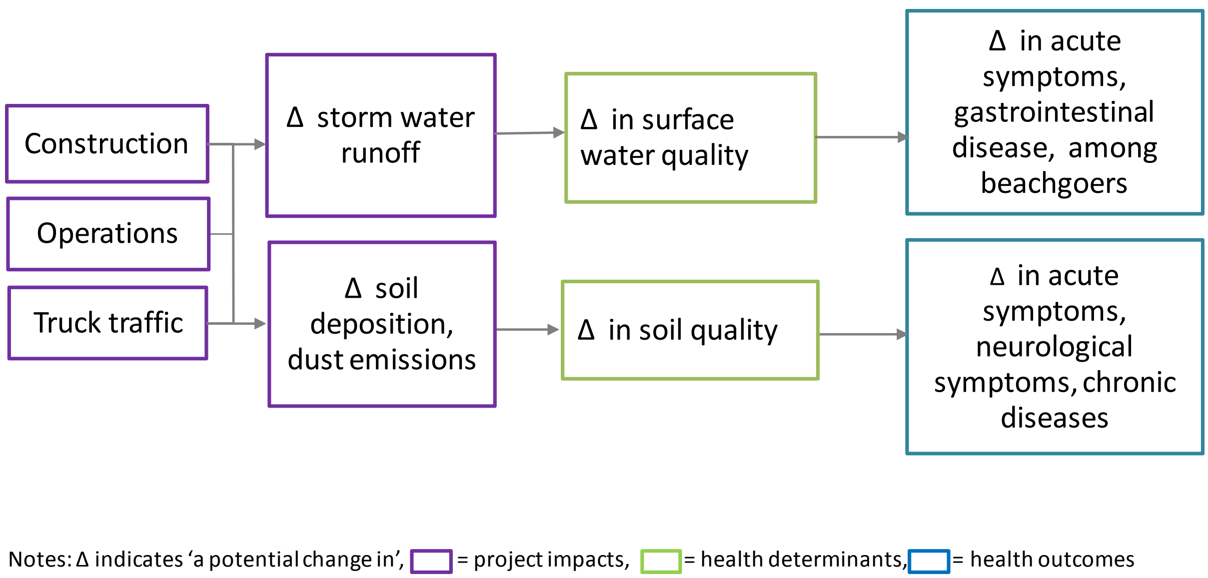

Figure 4-4 Water and Soil Quality Pathway Diagram

4.2.3 Upset Scenarios

Two potential types of upset scenarios were identified as major health concerns in the scoping phase: (1) an oil spill to surface waters, and (2) a well blowout event. While there are other potential upset scenarios related to the proposed Project, this HIA focused on these two upset scenarios based on community concerns voiced during the scoping meeting and the accidents that could present the highest risk to the public.

An oil spill that is sufficient in volume could impact the adjacent beach and/or the Pacific Ocean. The beach and ocean provide potential exposure pathways for recreational users to come into contact with crude oil from a spill. The ingestion of contaminated fish or seafood caught from the ocean also provides a potential exposure pathway in the event of an oil spill. Additionally, a well blowout occurring on the Site could immediately affect the public if the explosion or explosion debris materials were to extend beyond the Project Site.

The accident and upset event diagram in Figure 4-5 summarizes the *potential* health effect pathways between the proposed Project and health outcomes in the event that an accident were to occur. It should be noted that this diagram, developed during the scoping step, is a preliminary effect pathway diagram. The next step in the HIA is the assessment step, which validate or invalidate each potential pathway.

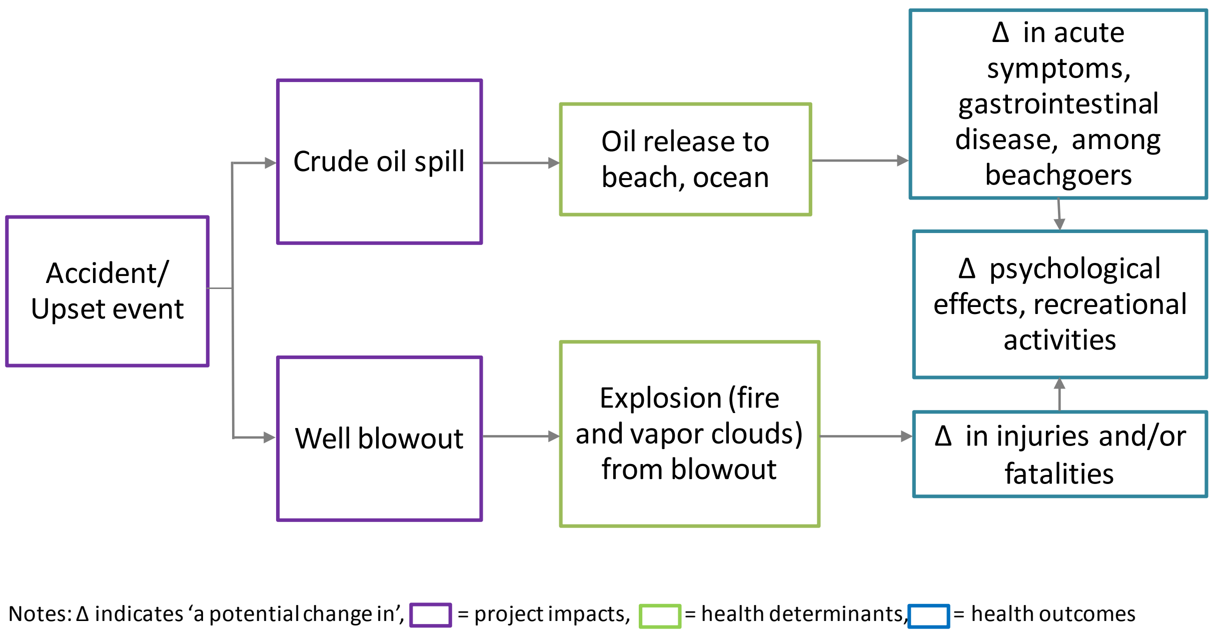

Figure 4-5 Upset Scenarios Event Pathway Diagram

4.2.4 Noise and Light

The Project has the potential to increase local noise levels. Construction, operations and related activities such as truck traffic are possible sources of noise associated with the proposed Project. Some studies have suggested that exposure to noise can lead to annoyance and sleep disturbance, or at very high levels can be associated with increased blood pressure (hypertension), cardiovascular disease, and cognitive impairment. Construction and operation activities also have the potential to cause vibrations. Ground vibration produced by the drilling and production activities would be below the 0.01 inches/second threshold when it reaches the closest sensitive business (i.e., a recording studio), which was determined to be less than significant in the EIR (MRS, 2014). Therefore, vibration was excluded from this assessment due to the negligible magnitude of potential impact and the low ranking vibration received in the community survey of health concerns (Table 4-1).

Road vehicle traffic is one of the sources of noise in urban areas, and has been well studied in the public health literature. Noise generated by vehicle traffic depends on presence of increased truck traffic, the traffic volume, traffic speed, and vehicle type. It is possible that the presence on increased truck traffic resulting from Project activities in the area could influence noise levels in the community.

In addition to potential noise impacts, disturbances associated with nighttime lighting have been identified as a subject of concern for some community members. The proposed Project will require lighting to maintain a safe working environment for employees at night. Key lighting features of the proposed Project include light fixtures on the Site entrance, the construction trailers and/or office buildings, and the drill rig equipment. As discussed in the EIR, the majority of lighting would be shielded and downcast, and would be located behind the 35-foot sound attenuation wall to minimize light spill or glare beyond the Site perimeter.

The noise and light pathway diagram in Figure 4-6 summarizes the *potential* health effect pathways between the proposed Project and health outcomes in the event that exposures were uncontrolled. It should be noted that this diagram, developed during the scoping step, is a preliminary effect pathway diagram. The next step in the HIA is the assessment step, which validate or invalidate each potential pathway.

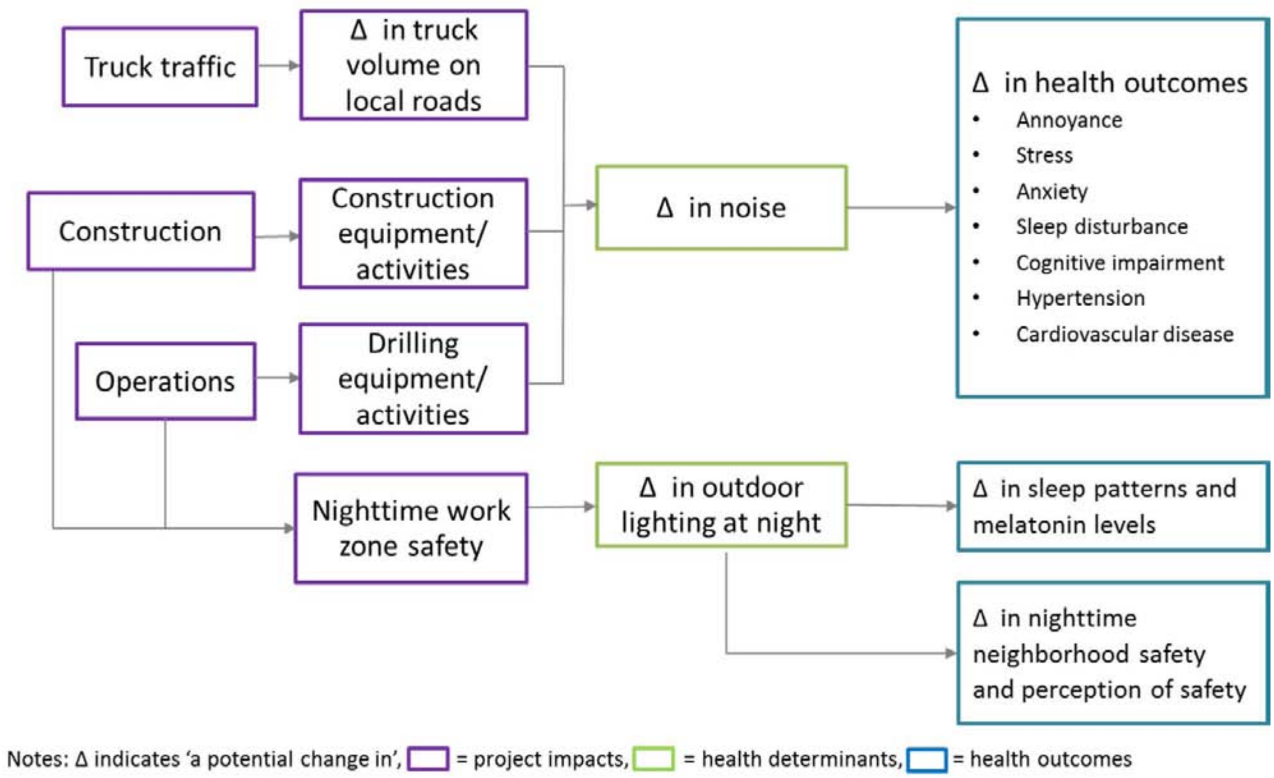

Figure 4-6 Noise and Light Pathway Diagram

4.2.5 Traffic

The construction and operations phases of the proposed Project will cause an increase in traffic, especially large truck traffic. Additional vehicles related to the proposed operations could change traffic congestion. The influx of new truck traffic and the potential impact on safety was one of the primary concerns of community members. Substantial increases in transportation and traffic can impact the health and safety of a community by heightening the potential risk of vehicle-vehicle, vehicle-pedestrian, and vehicle-bicyclist accidents. Perceptions about traffic safety hazards can influence health by altering actives such as walking and biking.

Increased traffic-related air pollution and traffic-related noise could also result in health changes in the community. The potential traffic-related impacts to air and noise are identified in Sections 4.2.1 and 4.2.4, respectively.

The traffic pathway diagram in Figure 4-7 summarizes the *potential* health effect pathways between the proposed Project and health outcomes in the event that exposures were uncontrolled. It should be noted that this diagram, developed during the scoping step, is a preliminary effect pathway diagram. The next step in the HIA is the assessment step, which validate or invalidate each potential pathway.

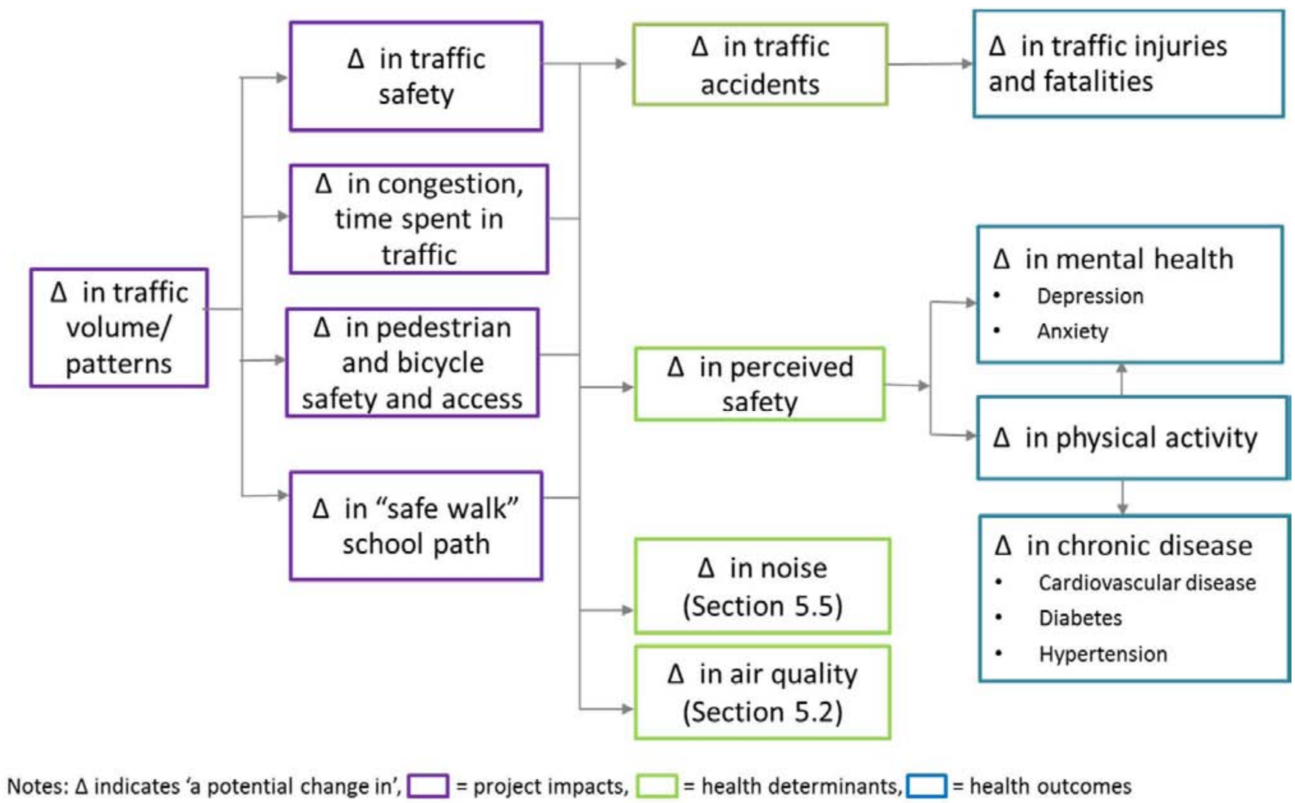

Figure 4-7 Traffic Pathway Diagram

4.2.6 Community Livability

Community livability is the focus area used to describe a series of community characteristics that enhance or degrade the experience of living in a specific area. The different aspects of community livability that are evaluated in this HIA were identified through public stakeholder engagement activities. During the scoping phase, many community members commented they were concerned that the presence of oil and gas industry could change the identity of Hermosa as “The Best Little Beach City.” As part of the Community Dialogue process, a community-led committee was assembled to define important quality of life factors. This committee found common themes that they feel describe the identity of Hermosa Beach, including (Appendix F):

- City streets are clean and the beach environment is regularly maintained;
- Reputation for being a small scenic town and friendly beach community;
- Bars that attract party crowds at night;
- Health conscious community that enjoys exercising and spending time outdoors;
- Accessible city government with active citizens involvement;
- Safe environment with low crime rate;
- Known for green/sustainable activities and carbon neutral goal; and,
- Schools have a high reputation and benefit from community involvement.

This area of health focus incorporates the quality of life values into an evaluation of three key aspects of the Project that could influence community livability: potential change in city identity, increased city revenue from oil and gas production, and access to neighborhood resources. Under these key areas of concern, six potential health determinants were included for evaluation in the HIA: property values; access to recreational resources and green space; aesthetics and visual resources; education funding; social cohesion; and, political involvement.

In addition to the potential impacts from Project construction and operation, there could be possible benefits and drawbacks from the opportunity to vote on the proposed Project. Community members have expressed concern that letting voters decide whether the proposed Project is approved has created political divisions and stress, with residents who are in favor divided from those who are opposed. While the debate over the proposed Project has the potential to disrupt social cohesion, involving the community in the political process can be beneficial to health and well-being.

The community livability pathway diagram in Figure 4-8 summarizes the *potential* health effect pathways between the proposed Project and health outcomes in the event that exposures were uncontrolled. It should be noted that this diagram, developed during the scoping step, is a preliminary effect pathway diagram. The next step in the HIA is the assessment step, which validate or invalidate each potential pathway.

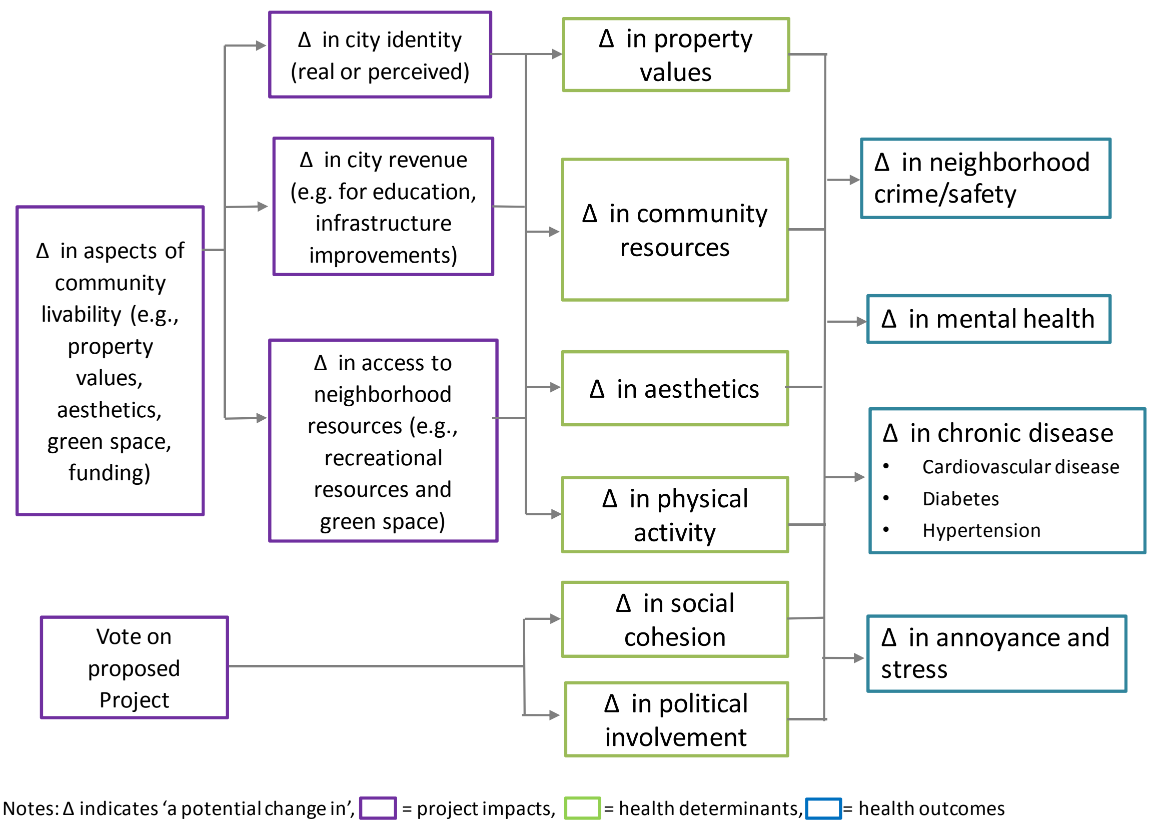

Figure 4-8 Community Livability Diagram

5.0 ASSESSMENT

As described previously, the assessment process in HIA involves: (1) developing a health baseline profile, (2) assessing the likely impacts, and (3) characterizing the health impacts. This Section first summarizes the baseline profile, and then provides the individual assessments and impact characterizations for each the six categories identified in the scoping phase (air quality, water and soil quality, noise and light, accidental releases, traffic, and community livability).

The HIA Team worked very closely with the EIR Team as it was being finalized. This HIA focused on conditions reported in the EIR after Project mitigation measures were considered. In some instances the HIA Team requested additional information from the EIR Team to complete this report (e.g., air quality and noise).

5.1 Baseline Health Assessment

The first step of the HIA assessment process is to create a baseline health profile that describes the current health conditions in the community. The baseline health assessment establishes the current health status of the City of Hermosa Beach residents in order to evaluate whether the current profile of the community reveals vulnerabilities to any of a number of health outcomes, and also to provide a benchmark so that the HIA can predict the extent of change from current health conditions (Ross et al., 2014).

Existing health and environmental data from regulatory agency monitoring and published reports were documented in the baseline health assessment, and some of the baseline data collected specifically for the EIR was also incorporated into the baseline health assessment. The following sections summarize key information from the Hermosa baseline health assessment that is provided as a separate report in Appendix E. The baseline health assessment remains unchanged from the February 2014 draft HIA.

5.1.1 Demographic Characteristics

Table 5-1 provides both city and county level demographic indicators from the US Census. The City of Hermosa Beach, as defined by the 2010 Census, has 19,506 residents with 52.7% male and 47.3% female. Age is an important factor in determining vulnerability. According to the census data for Hermosa, approximately 25% of the population may be considered to be more vulnerable to certain environmental exposures, based on age (9% over the age of 65 and 16% under 18 years). This is fewer than the percentage of Los Angeles County residents considered vulnerable to environmental exposures based on age (35%).

In the 2010 US Census, 95.8% of residents in Hermosa reported one race: 86.8% identified as White, 5.7% as Asian, 1.2% as Black or African American, 0.3% as American Indian and Alaska Native, 0.2% as Native Hawaiian and Other Pacific Islander, and 1.7% as some other race. Compared to the County of Los Angeles, Hermosa is much less racially and ethnically diverse. On the county level, 48.2% of the population identifies as Hispanic or Latino while only 8.4% of the Hermosa population identifies as Hispanic or Latino.

Education level, income, and housing are all components of social determinants of health. Social determinants of health refer to the role that our social environment and economic situation play in shaping our health, as social and economic factors are the single largest predictor of health outcomes, compared to clinical health care, health behaviors, and the physical environment (LACDPH, 2013). Nearly 70% of Hermosa residents have obtained a bachelor's degree or higher, compared to less than 30% in greater Los Angeles County. Median household income in Hermosa Beach is almost double that of LA County ($102K vs. $56K). Fewer than 4% of Hermosa residents live in poverty, compared to 16.3% of LA County residents. In contrast to the income profile, the homeownership rate in Hermosa is less than that of LA County (44.9% versus 47.8%). The homeownership profile is likely explained by Hermosa as a beach tourist destination and an area highly attractive to both renters and leasers. Further, with a median housing unit value over one million dollars, homeownership in Hermosa is over twice as expensive in Hermosa compared to Los Angeles County.

Overall, demographic indicators show that Hermosa Beach is not highly vulnerable to negative health outcomes traditionally associated with poverty, unemployment, and low educational attainment.

Table 5-1 Demographic Summary (US Census, 2013)

2010 Census Measures	Hermosa Beach	LA County
Population	19,506	9,818,605
Persons under 18 years, percent	15.9%	23.7%
Persons 65 years and over, percent, 2010	9.0%	11.5%
Female persons, percent	47.3%	50.7%
Race		
White alone, percent	86.8%	71.6%
Black or African American alone, percent	1.2%	9.3%
American Indian and Alaska Native alone, percent	0.3%	1.5%
Asian alone, percent	5.7%	14.5%
Native Hawaiian and Other Pacific Islander alone, percent	0.2%	0.4%
Ethnicity		
Hispanic or Latino, percent	8.4%	48.2%
High school graduate or higher, percent of persons age 25+, 2007-2011	98.5%	76.1%
Bachelor's degree or higher, percent of persons age 25+, 2007-2011	69.9%	29.2%
Homeownership rate, 2007-2011	44.9%	47.8%
Housing units in multi-unit structures, percent, 2007-2011	48.4%	41.9%
Median value of owner-occupied housing units, 2007-2011	$1,000,001	$478,300
Median household income, 2007-2011	$102,289	$56,266
Persons below poverty level, percent, 2007-2011	3.60%	16.30%

5.1.2 Current Health Conditions

Available data from various sources were gathered in order to characterize the current health status of the community compared to the expected health status based on data from LA County or California. Health conditions examined include cancers, mortality, hospitalizations, birth outcomes, and traffic-related injuries.

Based on the Los Angeles County Cancer Registry, the observed number of cancer cases in the City of Hermosa from 2000 to 2010 was within or below the expected number, based on age-, race- and sex-adjusted incidence rates for Los Angeles County, for most cancers. Exceptions include melanoma (122 cases versus 24-49 expected) and breast cancer (148 cases versus 90-120 expected). The observed number of colorectal cancers was significantly lower in Hermosa (41 cases versus 51-84 expected).

The statistically significant increase in melanoma and breast cancer diagnoses among residents of Hermosa Beach compared to Los Angeles County can largely be explained by known lifestyle risk factors. Higher socioeconomic status is an accepted risk factor for both of these cancers and the demographic profile shows that Hermosa Beach residents have higher income and education than Los Angeles County residents as a whole. In addition, sun exposure is the strongest risk factor for melanoma and thus an elevated incidence rate would be expected in the Southern California beach communities, assuming these residents spend more time in the sun during daylight hours compared to residents elsewhere in the county. Otherwise there is no evidence that residents of Hermosa Beach experience unusually high or low risk of common types of cancer (Cozen, 2014).

Hermosa Beach appears to have a favorable mortality profile, according to all-cause mortality, diseases of the heart, and cancer, compared to LA County (CDPH, 2013). The unadjusted all-cause mortality rate in Hermosa (40.5 deaths per 10,000 people) is lower than the all-cause mortality rate in Los Angeles County (56.9 deaths per 10,000 people). Hermosa mortality rates are also lower for diseases of the heart (9.2 versus 15.8) and cancer (9.0 versus 13.9). However, differences in population age distribution may explain an apparent decreased risk of mortality in Hermosa Beach. For example, age is significantly associated with both heart diseases and cancers, and the County of Los Angeles has a greater proportion of people age 65 years and older (11.5 %) compared to Hermosa (9%).

Hospitalization rates for asthma, diabetes, acute myocardial infarction, and mental illness are overall much lower in Hermosa Beach compared to California (OSHPD, 2013). The rate of patients hospitalized for alcohol-drug dependence/alcohol-drug induced mental disease is elevated in Hermosa compared to California (169 versus 109 hospitalizations per 100,000 people). While hospitalization data may indicate higher than expected alcohol and drug use in Hermosa, these unadjusted results do not allow conclusions to be made about statistical significance.

A birth profile for the Hermosa ZIP code was accessed from the California Department of Public Health data for 2011 (CDPH, 2013b). Access to prenatal care appears slightly better in Hermosa compared to state-wide; 88% of women in Hermosa received prenatal care in the first trimester versus 82% of women in California. The rate of low birth weight infants born weighing less than 2,500 grams (about 5.5 pounds) is the same among Hermosa and California births (7% in both populations). In 2011, nearly half of births in Hermosa Beach (47%) were to mothers age 35 and older versus 19% of births in California; indicating a potential vulnerability to certain developmental conditions, such as autism or Down’s syndrome.

Information regarding injury and fatality from traffic conditions was gathered from the California Highway Patrol Integrated Traffic Records System (CHP 2014). From 2009 to 2011, the annual number of reported vehicle-pedestrian collisions resulting in injury in Hermosa ranged from 3 to 10, the annual number of reported vehicle-bicycle collisions resulting in injury ranged from 6 to 13, and the annual number of reported vehicle-vehicle collisions resulting in injury ranged from 36 to 44. While vehicle-vehicle accidents are far more common than vehicle-pedestrian and vehicle-bicycle accidents, pedestrians and bicyclists are more likely to suffer from injuries and severe injuries as a result of the collision compared to motorists or vehicle passengers. Fatalities due to traffic accidents are extremely rare in Hermosa.

5.1.3 Environmental Quality

Existing environmental quality measures from regulatory agency monitoring and reporting were gathered in order to characterize the environmental conditions in Hermosa.

South Coast Air Quality Management District (SCAQMD) air monitoring stations provide data for criteria air pollutants throughout Orange County, Los Angeles, Riverside, and San Bernardino counties. Hermosa does not have an air monitoring station within its boundaries, and is contained in the Southwest Coastal Los Angeles County area with an air monitoring station in nearby Hawthorne. SCAQMD data for 2011 to 2012 show exceedances of the particulate matter PM_{10} annual average standard of 20 $\mu g/m^3$ in 2011 (21.7 $\mu g/m^3$), as well as the ozone 1-hour maximum standard of 0.09 ppm and ozone 8-hour maximum standard of 0.07 ppm in 2012 (0.11 and 0.08 ppm, respectively, in the vicinity of Hermosa Beach). Local air monitoring data is not available for smaller particulate matter $PM_{2.5}$ but estimated $PM_{2.5}$ in Hermosa exceeds the California standard of 12 $\mu g/m^3$ (13.74 $\mu g/m^3$) (Cal/EPA and OEHHA 2013). Traffic density in the region is likely a significant contributor to particulate air pollution.

The California Environmental Protection Agency (Cal/EPA) and the California Office of Environmental Health Hazard Assessment (OEHHA) developed CalEnviroScreen, an online mapping application, that can be used to identify California communities that are disproportionately burdened by multiple sources of pollution (Cal/EPA and OEHHA 2013). CalEnviroScreen assigns a score to each community based on cumulative environmental sources such as ambient air, pesticide use, chemical releases, traffic, hazardous substances cleanup sites, risk to groundwater, permitted hazardous waste facilities, surface water pollutants, and solid waste sites. Overall, Hermosa ranks in the lowest 10% for CalEnviroScreen scores, indicating an overall low pollution burden in Hermosa Beach relative to California.

5.1.4 Health Supporting Resources and Health Promotion

Health supporting resources such as the availability of nutritious foods and health care services are important indicators for various health conditions in communities. There are two large chain groceries, ten other groceries, and one farmer's market within Hermosa, providing access to fresh foods throughout the City. There are no licensed healthcare facilities within the City of Hermosa. There are various healthcare facilities located in the nearby City of Torrance; however, for those community members who do not own a vehicle, it may be challenging to access health care.

The City of Hermosa Beach and its community members are exceptionally committed to health promotion and community livability. In 2012, the City of Hermosa Beach launched the Healthy Air Hermosa public education campaign to ensure residents and visitors can enjoy a smoke-free environment in public outdoor gathering spots such as the Pier, the Strand, the Greenbelt, Pier Plaza, City owned parking lots, and all parks. Smoking was previously banned on the beach, in city buildings and inside restaurants (City of Hermosa Beach, 2012). In February 2013, the City of Hermosa Beach became the first community in the country to achieve Blue Zones Community Policy designation – for adopting policies to improve its residents' well-being. Those policies include a "Living Streets Policy" focused on making the community more livable, walkable, and bikeable (e.g., Pier Ave); and a pledge to create a community garden.

A Gallup-Healthways Well Being survey of 1,332 Hermosa, Manhattan and Redondo residents conducted in 2010 found that the overall well-being rating local residents was higher than the California average and above the top tier of other cities. More than 90 percent of local residents said they had access to health care, health insurance and enough money for food, shelter and other basic needs. Two-thirds were found to be "thriving." However, the survey also found that 46 percent of the Beach Cities residents felt stressed for most of the day, a number that ranked them 176th out of 188 communities surveyed. When asked if they had significant worries, 37 percent said they did, which ranked the Beach Cities 177th out of those 188 communities surveyed (Blue Zones, 2010).

5.1.5 Discussion of Vulnerable and Sensitive Populations

In general, HIAs seek to discuss the potential impact on vulnerable populations of society that may be disproportionately affected by the project. Invariably, children and the elderly are considered to be vulnerable populations with respect to numerous different types of environmental exposure. This is also true for many of the determinants that were evaluated in this HIA. Vulnerable populations were also included as part of the assessment and the potential for disproportionate impacts on these individuals was carefully considered in the classification of magnitude and adaptability. They were also taken into account when making additional recommendations. Each assessment provides details of the vulnerable population(s) considered in the evaluation.

Of particular interest in this HIA, the baseline health assessment revealed that there is only a small portion of the population of Hermosa Beach that lives below the poverty line (4%). Social environmental equity issues are not a concern as there is no concentration of low-income housing in proximity to the Project.

In addition, over the course of the 35 year life of the Project there is no indication that population demographics will change. Seventy-five percent of the population is between 18 and 65, with over 40% between the ages of 25 and 44.

5.2 Air Quality Assessment

Air emissions from the construction and operation of the Project could affect air quality in the City of Hermosa Beach. The identification of the air pollutants to be assessed in the HIA began with the emissions inventory associated with the construction and operations of the Project. Emissions associated with the Project and modeled in the EIR include criteria pollutants (e.g., carbon monoxide, nitrogen dioxide, sulfur dioxide and particulate matter), volatile organic compounds (VOCs) and other toxic air contaminants (e.g., polycyclic aromatic hydrocarbons (PAHs) and metals), and odorous / toxic compounds (e.g., hydrogen sulfide or H_2S). Carbon monoxide (CO) and sulfur dioxide (SO_2) were not carried forward in the HIA as the calculated emission estimates for these criteria pollutants were determined to be below the South Coast Air Quality Management District (SCAQMD) regional and local thresholds (see Tables 4.2-7 to 4.2-9 of the EIR) under both the mitigated and unmitigated scenarios, suggesting that the CO and SO_2 emissions associated with the Project will have negligible to low impact on current air quality on both a local and regional scale. All other pollutants identified in the EIR exceeded some threshold of significance in the EIR, and therefore were carried forward for further evaluation in this HIA. These pollutants include:

- Nitrogen dioxide (NO_2)
- Particulate matter (PM_{10} and $PM_{2.5}$)
- Toxic air contaminants (TACs)
- Hydrogen sulfide (H_2S) and other odorous compounds

This section presents the potential health effects that might be experienced by people from short-term and long-term exposure to each of these air pollutants, the ambient air concentrations for each of the air pollutants, and the potential health effects associated with the maximum predicted air concentrations of the air pollutants associated with the proposed Project when added to current (or existing) air concentrations.

5.2.1 Nitrogen Dioxide (NO_2)

5.2.1.1 NO_2 and Health

Depending on the concentrations in air, NO_2 is associated with a range of respiratory effects (USEPA, 2008). According to the Agency for Toxic Substances and Disease Registry (ATSDR, 2002), low levels of NO_2 in air can irritate the eyes, nose, throat and lungs. Breathing air with high concentrations of NO_2 can result in changes in pulmonary function due to inflammation of lung tissue. Exposure to NO_2 can have a more pronounced effect on the health of individuals with pre-existing respiratory conditions, such as asthma, chronic obstructive pulmonary disease or bronchitis. Short term NO_2 exposure is strongly associated with asthma exacerbation (i.e., wheezing, cough, use of medication) among children (USEPA, 2008).

To protect the general public against the described health effects, regulatory bodies across the globe have set ambient air quality guidelines for NO_2. In California, ambient air quality standards are defined as the "maximum allowable level of [an] air pollutant that can be present in outdoor air for a given averaging time without causing harmful health effects to most people" (CalEPA, 2007). The California 1-hour AAQS for NO_2 is 0.18 ppm (340 $\mu g/m^3$). In setting the 1-hour AAQS, the California Environmental Protection Agency (CalEPA) states that the short-term effect of interest includes a potential to aggravate chronic respiratory disease and respiratory symptoms in sensitive groups (CalEPA, 2007). California's annual AAQS for NO_2 is 0.030 ppm (57 µg/m^3).

A summary of the relationships between short-term exposure to NO_2 and health effects reported in the published scientific literature is provided in Table 5-2. Although some studies have reported mild respiratory effects in asthmatics at NO_2 concentrations less than 375 µg/m³ (CalEPA, 2007), because of the absence of a clear dose–response relationship and statistical uncertainty, the findings of these studies are not considered to reflect the acute effects of NO_2 exposure (Forastiere et al., 1996; Cal EPA, 2007). A recent meta-analysis of NO_2 exposure and airway hyper-responsiveness in asthmatic adults suggests that there is no evidence that NO_2 causes clinically relevant effects in asthmatics at concentrations up to 1,100 µg/m³ (585 ppb) (Goodman et al., 2009).

The WHO set its 1-hour air quality guideline for NO_2 at 200 µg/m³ (106 ppb; WHO, 2006). This value is based on the increased incidence of adverse respiratory effects in animal and epidemiological studies. Similarly, the USEPA established a 1-hour National Ambient Air Quality Standard of 188 µg/m^3 (100 ppb) for NO_2 (USEPA, 2008). Both the WHO guideline and USEPA NAAQS are intended to be protective of sensitive individuals in the population, including asthmatics, children, the elderly and individuals with pre-existing respiratory conditions. It is noted that the 2008 USEPA NAAQS review of NO_2 states there was little evidence of an effect threshold, or a value below which no health effects would be expected, based on their review of the data. The USEPA NAAQS and World Health Organization air quality guideline are more stringent than California's 1-hour AAQS for NO_2. Although the NAAQS is slightly lower than the WHO guideline, the NAAQS is based on a 3-year average 98th percentile of the annual distribution of daily maximum 1-hour concentrations. In contrast, the WHO air quality guideline is compared against the maximum predicted hourly air concentrations, making it a slightly more conservative metric for assessing the potential short-term health risks for NO_2. As such, the WHO 1-hour air quality guideline was used to characterize the short-term health risks associated with NO_2 in the HIA.

The USEPA (2010) chronic NAAQS for NO_2 is 100 µg/m³ (53 ppb). The NAAQS was developed in 1971 (USEPA, 2010) and has been subsequently upheld through a number of scientific and regulatory reviews between 1971 and 2010. A scientific review of the annual NAAQS conducted in 1993 upheld the standard of 100 µg/m³, based on the results of a meta-analysis of epidemiological studies. In 1996, the annual standard was maintained by the USEPA on the basis that, in combination with the short-term standard, the annual standard was protective of both the potential short-term and long-term human health effects of NO_2 exposure (USEPA, 1996). The most recent edition of the Final Rule (USEPA, 2010) indicates that the annual standard was upheld due to the uncertainty associated with the potential long-term effects of NO_2. The uncertainty associated with potential long-term effects of NO_2, in the case of respiratory morbidity, is due to the high correlation among traffic pollutants which makes it difficult to accurately estimate the independent effects of NO_2 in long-term exposure studies.

The WHO (2006) chronic air quality guideline for NO_2 is 40 µg/m³ (0.023 ppm). The WHO (2006) indicates that the 40 µg/m³ is based on consideration of background concentrations and the observation that adverse health impacts may occur when concentrations in addition to background exceed that level. Although this value is not well substantiated in the available supporting documentation, it is the more conservative or stringent value when compared to the USEPA NAAQS and California AAQS. As such, the WHO annual air quality guideline was used to characterize the long-term health risks associated with NO_2 in the HIA.

Table 5-2 Potential Acute Health Effects Associated with NO_2

Air Concentration µg/m³ and (ppb)	Description of the Potential Health Effects[1]
<190 (101)	No documented reproducible evidence (consistent and significant) of adverse health effects among healthy individuals or susceptible individuals following short-term exposure. Study results are variable and are indiscernible from background or control groups.
190 (101) to 560 (298)	Increased airways responsiveness, detectable via meta-analysis, among asthmatics. Large variability in protocols and responses.
490 (261)	Allergen-induced decrements in lung function and increased allergen-induced airways inflammatory response among asthmatics. Most studies used non-specific airways challenges. No NO_2-induced change in lung function. No documented effects among healthy individuals.
560 (298) to 750 (399)	Potential effects on lung function indices, including inconsistent changes forced expiratory volume in 1 second (FEV1) and forced vital capacity among patients with chronic obstructive pulmonary disease (COPD) during mild exercise.
1,900 (1,011) to 3,700 (1968)	Increased likelihood of inflammatory response and airway responsiveness among healthy individuals during intermittent exercise. Symptoms have not been detected by most investigators among healthy individuals. Asthmatics might experience small decrements in FEV1.
≥3,700 (≥1968)	Changes in lung function, such as increased airway resistance, in healthy individuals.

Notes:

1 These descriptions identify the health effects that might be experienced among normal, healthy individuals following acute exposure to NO_2. Also listed are the types of symptoms that might occur among individuals with pre-existing breathing disorders, such as asthma, bronchitis or COPD. The exact nature and severity of responses that might occur among individuals with pre-existing conditions will depend on several factors, including:

- the severity of the person's condition
- the age of the individual
- the level of management of the disorder, including the availability and use of medications
- the person's level of physical activity
- external environmental factors such as temperature and humidity

The symptoms that could be experienced by these individuals could be more or less severe that those described because of these factors.

Sources: Azadniv *et al.* (1998); Beil and Ulmer (1976); Blomberg *et al.* (1997, 1999); Cal EPA (2007); Devlin *et al.* (1999); Gong *et al.* (2005); Goodman *et al.* (2009); Jorres *et al.* (1995); Morrow *et al.* (1992); von Nieding *et al.* (1979, 1980); von Nieding and Wagner (1977); Vagaggini *et al.* (1996); USEPA (2008).

5.2.1.2 Current Conditions

In 2012, background or ambient air concentrations of NO_2 were measured at 26 stations within the SCAQMD; however, a monitoring station was not identified within the local vicinity of the Project, nor was a station identified within the City of Hermosa Beach. The closest air monitoring station to the Project that measures ambient NO_2 concentrations in air is in the City of Hawthorne within Southwest Coastal Los Angeles County (Area 3, Station 820). For the purposes of the Project EIR and HIA, it was assumed that the air quality in Hermosa Beach would be similar to that of Hawthorne. In 2012, the maximum measured 1-hour NO_2 concentration at Station 820 was 116 µg/m³, and the annual average NO_2 concentration was 19.6 µg/m³. These concentrations remain below the WHO air quality guidelines for NO_2 (i.e., 1-hour AQG of 200 µg/m³ and annual AQG of 40 µg/m³) (WHO, 2006).

As described in Section 5.2.1.1, short-term and long-term exposure to air pollutants can affect human health. The current health status of Hermosa Beach residents is described in Appendix E using the health statistics for the incidence and mortality rates of diseases that are often associated with air pollution in the scientific literature, such as chronic lower respiratory disease, heart disease and asthma.

5.2.1.3 Project Impact

In order to predict the maximum 1-hour NO_2 air concentrations (i.e., background plus Project) that people might experience in the vicinity of the Project, the maximum 1-hour NO_2 air concentrations predicted for the Project at the Point of Maximum Impact (PMI) and within the residential community surrounding the Project under the mitigated scenario were added to the maximum 1-hour background or ambient air concentration of NO_2 described in Section 5.2.1.2. Similarly, the maximum annual average NO_2 air concentrations (i.e., background plus Project) were calculated by adding the maximum predicted annual average NO_2 air concentration for the Project under the mitigated scenario to the annual average background or ambient air concentration of NO_2 described in Section 5.1.1.2. Table 5-3 provides the maximum predicted 1-hour and annual air concentrations and the corresponding air quality guidelines established by the WHO for the protection of public health.

Table 5-3 Comparison of Maximum Predicted NO_2 Air Concentrations for the Mitigated Scenario against Health-Based Air Quality Guidelines

Averaging Time	Location	Background Air Concentration[1] (µg/m³)	Maximum Predicted Air Concentration (µg/m³)		Air Quality Guideline[2] (µg/m³)
			Project	Cumulative (Background + Project)	
1-hour	PMI	116	38.2	154	200
	Residential	116	33.3	149	
Annual	PMI	19.6	3.6	23.2	40
	Residential	19.6	2.3	21.9	

Notes:
[1] Based on the maximum of the measured ambient hourly NO_2 air concentrations within Southwest Coastal Los Angeles County (Area 3, Station 820) during 2012.
[2] WHO (2006)
PMI = Point of Maximum Impact
Residential = Highest concentration at homes adjacent to the Site

The maximum predicted 1-hour and annual NO_2 concentrations for the PMI and the residential locations are below the WHO air quality guidelines, indicating that adverse health effects are not expected to result from either short-term or long-term exposure to NO_2. Moreover, there are no predicted "exceedances" of California's Ambient Air Quality Standards, or the USEPA National Ambient Air Quality Standards.

The impact of Project-related NO_2 emissions on the health of the community is provided in Table 5-4.

Table 5-4 HIA Evaluation Matrix – Nitrogen Dioxide (NO_2)

Health Determinant	Nitrogen Dioxide (NO_2)
Potential Health Outcome	Respiratory irritation and airway constriction
Pre-Mitigation Discussion	The direction of the pre-mitigated impact is negative. Construction activities and operations could generate NOx emissions that exceed South Coast Air Quality Management District Thresholds.
EIR Mitigation	NOx reduction program (AQ-1b), limited flaring (AQ-3a), and air monitoring plan (AQ-5d)
Geographic Extent	Localized
Vulnerable Populations	Children, elderly, individuals with pre-existing conditions
Magnitude	Low
Adaptability	High
Likelihood	Unlikely
Post-Mitigation Health Effect	No Substantial Effect
Comments or Additional Recommended Measures	None.

As described in Table 5-4, without mitigation, construction activities and operations could generate NOx (e.g., NO_2) emissions that exceed SCAQMD thresholds. However, the Project will comply with a range of air quality mitigation measures and permits, including combustion emission limits. These mitigation measures were described in detail in Section 4.2.4.1 of the EIR.

The influence of the proposed Project on NO_2 ground-level air concentrations is expected to be **'localized'** because air pollutant concentrations dissipate from the source**.** The vulnerable population identified for air quality impacts are **'children, the elderly and individuals with pre-existing health conditions'**. The magnitude of the health effect related to NO_2 is **'low',** meaning that they are not expected to be high enough to pose a health hazard to the community of Hermosa Beach. The adaptability is considered **'high',** in that people are expected to be unaffected or easily able to adapt to the change in NO_2 emissions (i.e., people will be able to maintain their pre-project level of health). The likelihood of an adverse health effect occurring as a result of the Project's NO_2 emissions was defined as **'unlikely'.** Based on the findings of the Air Quality assessment and the planned mitigation measures for the Project (see Section 4.2 of the EIR), the potential NO_2-related health impact associated with the Project is classified as **'no substantial effect'**. Therefore, no additional measures are recommended.

5.2.2 Particulate Matter (PM)

5.2.2.1 PM and Health

Particulate matter is a widespread air pollutant composed of a mixture of solid and liquid particles, and its effects on health are well documented. Particles with a diameter of 10 micrometers or smaller are referred to as PM_{10}, and particles with a diameter of 2.5 micrometers or smaller are known as $PM_{2.5}$. Both PM_{10} and $PM_{2.5}$ include inhalable particles that are small enough to enter the lungs, and both short-term (hours, days) and long-term (months, years) exposure can result in increased respiratory and cardiovascular disease. Specifically, PM exposure is associated with exacerbation of asthma and an increase in hospital admissions. In addition, increased mortality rates from cardiovascular and respiratory diseases are well documented in large urban centers. The most susceptible groups include people with pre-existing lung or heart disease, older adults and children.

Long-term exposure to smaller particles ($PM_{2.5}$) tends to be a stronger risk factor for morbidity and mortality than exposure to larger particles (PM_{10}) (Zanobetti and Schwartz, 2009).

According to the California Environmental Protection Agency, "exposure to outdoor PM_{10} and $PM_{2.5}$ levels exceeding current air quality standards is associated with increased risk of hospitalization for lung and heart-related respiratory illness, including emergency room visits for asthma" (CalEPA, 2005).

California set its 24-hour and annual standards for PM_{10} at 50 µg/m^3 and 20 µg/m^3, respectively. Like California, WHO's 24-hour and annual air quality guidelines for PM_{10} are 50 µg/m^3 and 20 µg/m^3, respectively (WHO, 2006). The USEPA does not have an annual NAAQS for PM_{10} but does offer a 24-hour standard of 150 µg/m^3.

While California does not have a 24-hour AAQS for $PM_{2.5}$, it has set its annual AAQS for $PM_{2.5}$ at 12 µg/m^3. This value was recommended by the California Air Resources Board and is based on a growing body of epidemiological and toxicological studies showing significant toxicity (resulting in mortality and morbidity) related to exposure to fine particles (CARB, 2009). The USEPA (2006) offers a 24-hour NAAQS of 35 µg/m^3 for $PM_{2.5}$ for primary and secondary particulate, which is intended to be protective of human health effects as well as several environmental and socioeconomic endpoints. The USEPA's annual primary NAAQS for $PM_{2.5}$ is 12 µg/m^3.

The WHO 24-hour and annual average air quality guidelines for $PM_{2.5}$ are 25 µg/m^3 and 10 µg/m^3, respectively. The WHO suggests that the annual average should take precedence over the daily guideline because at low levels there is less concern for episodic excursions. The annual average guideline is based on long-term exposure studies using the American Cancer Society (ACS) data (Pope et al., 2002) and Harvard Six-Cities data (Dockery et al., 1993). The studies reported a robust association between PM exposure and mortality. Historical mean $PM_{2.5}$ concentrations across cities in these two studies were 18 and 20 µg/m^3, respectively, but average concentrations in individual cities were as low as 11 µg/m^3 over the period of study. An annual mean guideline concentration of 10 µg/m³ was therefore noted to be below the mean for most likely effects (WHO, 2006).

WHO acknowledges that "research has not identified thresholds below which adverse effects do not occur" (WHO, 2006). As such, WHO (2006) states that ambient air quality guidelines for $PM_{2.5}$ may never be fully protective of human health:

> *"As thresholds have not been identified, and given that there is substantial inter-individual variability in exposure and in the response in a given exposure, it is unlikely that any standard or guideline value will lead to complete protection for every individual against all possible adverse health effects of particulate matter. Rather, the standard-setting process needs to aim at achieving the lowest concentrations possible in the context of local constraints, capabilities and public health priorities."*

In light of the concept that a clear threshold of effect has not been identified for $PM_{2.5}$, the more stringent WHO guidelines were used to characterize the PM-related health risks in the HIA.

5.2.2.2 Current Conditions

In 2012, background or ambient air concentrations of PM_{10} were measured at 22 stations within the SCAQMD; however, the closest ambient air monitoring station to the Project was identified within the Southwest Coastal Los Angeles County (Area 3, Station 820). For the purposes of the EIR and HIA, it was assumed that air quality in Hermosa Beach would be similar to that of Hawthorne. In 2012, the maximum measured 24-hour PM_{10} concentration was 31 µg/m³ and the annual average was 19.8 µg/m³. These concentrations remain below the California and WHO 24-hour and annual air quality guidelines for the protection of public health (i.e., 50 µg/m³ and 20 µg/m³, respectively).

Table 5-5 presents the 24-hour and annual air concentrations of PM_{10} measured at ambient air monitoring stations across Los Angeles County in 2012. Note that 98th percentiles were not reported for the 24-hour averaging time.

Table 5-5 PM_{10} Air Concentrations Measured in Los Angeles County in 2012

Monitoring Station		Measured Air Concentration (µg/m³)	
		24-hour Maximum	**Annual Average**
1	Central LA	80	30.2
2	Northwest Coastal LA County	--	--
3	Southwest Coastal LA County (Station 820)	31	19.8
4	South Coastal LA County 1 South Coastal LA County 2 South Coastal LA County 3	45 54 --	23.3 25.5 --
6	West San Fernando Valley	--	--
7	East San Fernando Valley	55	26.4
8	West San Gabriel Valley	--	--
9	East San Gabriel Valley 1 East San Gabriel Valley 2	78 --	30.3 --
10	Pomona/Walnut Valley	--	--

Monitoring Station		Measured Air Concentration (µg/m³)	
		24-hour Maximum	Annual Average
11	South San Gabriel Valley	--	--
12	South Central LA County	--	--
13	Santa Clarita Valley	37	19.6

Source: 2012 Air Quality: South Coast Air Quality Management District
--Not Available

Background or ambient air concentrations of $PM_{2.5}$ were measured at 20 stations within the SCAQMD during 2012, and nine in Los Angeles County. However, the Southwest Coastal Los Angeles County air monitoring station (Area 3, Station 820) did not measure for $PM_{2.5}$. The closest stations that measured for $PM_{2.5}$ are within South Coastal Los Angeles County (Area 4, Station 072 and 077) and South Central Los Angeles County (Area 12, Station 112). In 2012, maximum 24-hour ambient $PM_{2.5}$ air concentrations measured at these stations ranged between 46.7 µg/m³ and 51.2 µg/m³, while annual $PM_{2.5}$ air concentrations ranged between 10.4 µg/m³ and 11.7 µg/m³.

Table 5-6 presents the maximum and 98th percentile 24-hour and annual air concentrations of $PM_{2.5}$ measured within Los Angeles County during 2012. These concentrations exceed the WHO 24-hour and annual air quality guidelines for $PM_{2.5}$ of 25 µg/m³ and 10 µg/m³, respectively (WHO, 2006). California has not established an AAQS for 24-hour $PM_{2.5}$, but the 98th percentiles of measured 24-hour $PM_{2.5}$ concentrations within Los Angeles County are below the 24-hour NAAQS for $PM_{2.5}$ of 35 µg/m³. In 2012, the measured annual average air concentrations of $PM_{2.5}$ were below California's annual AAQS and the USEPA NAAQS for $PM_{2.5}$ (12 µg/m³) at the majority of the monitoring stations in LA County. The exceptions were at Central Los Angeles and East San Fernando Valley, where the measured annual average $PM_{2.5}$ air concentrations were 12.55 µg/m³ and 12.17 µg/m³, respectively.

Table 5-6 $PM_{2.5}$ Air Concentrations Measured in Los Angeles County in 2012

Monitoring Station		24-Hour Air Concentration (µg/m³)		Annual Air Concentration (µg/m³)
		Maximum	98th Percentile	Average
1	Central LA	58.7	31.8	12.55
2	Northwest Coastal LA County	--	--	--
3	Southwest Coastal LA County (Station 820)	--	--	--
4	South Coastal LA County 1 (Station 72) South Coastal LA County 2 (Station 77) South Coastal LA County 3	49.8 46.7 --	26.4 25.1 --	10.37 10.57 --
6	West San Fernando Valley	41.6	31.2	10.48
7	East San Fernando Valley	54.2	28.2	12.17
8	West San Gabriel Valley	30.5	24.2	10.12
9	East San Gabriel Valley 1 East San Gabriel Valley 2	39.6 --	25.6 --	11.02 --
10	Pomona/Walnut Valley	--	--	--

11	South San Gabriel Valley	45.3	28.5	11.85
12	South Central LA County (Station 112)	51.2	30.3	11.69
13	Santa Clarita Valley	--	--	--

Source: 2012 Air Quality: South Coast Air Quality Management District
--Not Available

5.2.2.3 Project Impact

Health impacts of particulate matter are greater from fine particles with aerodynamic diameters less than 2.5 μm, since they can be carried deep into the alveolar spaces of the lung and may reach the circulatory system where they could affect cardiac function (Pope and Dockery, 2006; USEPA, 2009; CCME, 2012). Therefore, fine particulate matter ($PM_{2.5}$) tends to exhibit a greater potential impact on human health than coarser particulate matter (Zanobetti and Schwartz, 2009). The air quality modelling conducted for the EIR conservatively assumed that all fine particulate matter would be in the smaller form (i.e., assumed all PM_{10} is $PM_{2.5}$). As a result, the discussion of the potential Project impacts focused on $PM_{2.5}$.

In order to predict the maximum 24-hour $PM_{2.5}$ air concentrations (i.e., background plus Project) that people might experience in the vicinity of the Project, the maximum 24-hour $PM_{2.5}$ air concentrations predicted for the Project at the PMI and within the surrounding residential community under the mitigated scenario were added to the 98th percentiles of 24-hour background or ambient air concentrations of $PM_{2.5}$ described in Section 5.2.2.2. Similarly, the maximum annual average $PM_{2.5}$ air concentrations (i.e., background plus Project) were calculated by adding the maximum predicted annual average $PM_{2.5}$ air concentration for the Project under the mitigated scenario to the annual average background or ambient air concentrations of $PM_{2.5}$ described in Section 5.2.2.2.

Table 5-7 compares the maximum predicted 24-hour and annual air concentrations to the corresponding WHO air quality guidelines for $PM_{2.5}$. In addition to the maximum predicted air concentrations at the PMI and residence, Table 5-7 also presents the Project's $PM_{2.5}$ concentrations averaged over the 1.5 x 1.5 mile air quality main receptor grid (see EIR, Section 4.2, Impact #AQ.7, page 4.2-62).

Table 5-7 Comparison of Maximum Predicted Air Concentrations for $PM_{2.5}$ for the Mitigated Scenario against the World Health Organization's Air Quality Guidelines

Averaging Time	Location	Background Air Concentration[1] (µg/m³)	Predicted Air Concentration (µg/m³)		Air Quality Guideline[2] (µg/m³)
			Project	Cumulative (Background + Project)	
24-hour	PMI	24.2 to 31.8[1]	4.2	28.4 to 36.0	25
	Residential	24.2 to 31.8[1]	2.3	26.5 to 34.1	
	Receptor grid average[3]	24.2 to 31.8[1]	0.5	24.7 to 32.3	
Annual	PMI	10.12 to 12.55	1.6	11.72 to 14.15	10
	Residential	10.12 to 12.55	0.6	10.72 to 13.15	
	Receptor grid average[3]	10.12 to 12.55	0.09	10.21 to 12.64	

[1] Based on the 98th percentile of measured daily $PM_{2.5}$ concentrations in LA County in 2012
[2] WHO 2006
[3] $PM_{2.5}$ concentrations averaged over the 1.5x1.5 mile air quality receptor grid
PMI = Point of Maximum Impact
Residential = Highest concentration at homes adjacent to the Site

As shown in Table 5-7, the maximum predicted 24-hour and annual concentrations for $PM_{2.5}$ at the PMI and in the surrounding residential community exceed the WHO air quality guidelines as a result of the assumed daily and annual background air concentrations. The upper end of the range of maximum predicted 24-hour concentrations for $PM_{2.5}$ also could exceed the USEPA 24-hour NAAQS of 35 µg/m³; however, this assumes that the background 24-hour $PM_{2.5}$ air concentrations within Hermosa Beach are comparable to Central Los Angeles or West San Fernando Valley. It is more likely that the current air quality within Hermosa Beach more closely resembles that of South Coastal Los Angeles County, where the maximum predicted 24-hour air concentration of $PM_{2.5}$ would remain below the 24-hour NAAQS of 35 µg/m³ (i.e., 29.3 to 30.6 µg/m³ at the PMI). Similarly, on an annual basis, the upper end of the range of maximum predicted $PM_{2.5}$ concentrations could exceed the annual AAQS in California and the NAAQS for $PM_{2.5}$ of 12 µg/m³. Assuming the background or ambient annual air concentrations for $PM_{2.5}$ in South Coastal Los Angeles County would result in predicted annual $PM_{2.5}$ concentration of 11.97 to 12.17 µg/m³ at the PMI, 10.97 to 11.17 µg/m³ at the highest residential location, and 10.46 to 10.66 µg/m³ averaged across the main air quality receptor grid. When adding the predicted values to the existing $PM_{2.5}$ air concentrations at the South Coastal Los Angeles County monitoring stations, the Project is not expected to result in exceedances of the California annual AAQS or USEPA NAAQS at the local residences.

The WHO chose an annual average concentration of 10 µg/m³ as its long-term air quality guideline as this represents the lower end of the range over which significant effects on survival were observed in the American Cancer Society's (ACS) study (Pope et al., 2002). In the ACS and Harvard Six-Cities studies (Dockery et al., 1993; Pope et al., 1995; HEI, 2000; Pope et al., 2002; Jerrett, 2005), robust associations were reported between long-term exposure to $PM_{2.5}$ and mortality. The historical annual mean $PM_{2.5}$ concentration was 18 µg/m³ (range, 11.0 to 29.6 µg/m³) in the Six-Cities study and 20 µg/m³ (range, 9.0 to 33.5 µg/m³) in the ACS study. In the ACS study, statistical uncertainty in the risk estimates becomes apparent at concentrations near 13 μg/m³. Below this level the confidence bounds significantly widen (i.e., the uncertainty grows).

Exceedances of the WHO air quality guidelines, California AAQS and USEPA NAAQS for $PM_{2.5}$ are due to existing conditions in the area. Existing $PM_{2.5}$ air concentrations in the area are in the range at which health effects have been identified in large urban centers. Based on the predicted values presented in Section 4.2 of the EIR and described herein, the Project is not expected to have a material impact on existing $PM_{2.5}$-related health risks to the community of Hermosa Beach. The impact of Project-related $PM_{2.5}$ emissions on the health of the community is provided in Table 5-8.As described in Table 5-8, without mitigation, construction activities and operations could result in emissions of fine particulate matter that exceed SCAQMD localized significance thresholds. However, the Project will comply with a range of air quality mitigation measures and permits, including combustion emission limits. Particulate matter emissions will be controlled, in part, through dust suppression program, and mitigation measures related to flaring and microturbine emissions. These mitigation measures were described in detail in Section 4.2.4.1 of the EIR.

Table 5-8 HIA Evaluation Matrix – Particulate Matter ($PM_{2.5}$)

Health Determinant	Particulate Matter ($PM_{2.5}$)
Potential Health Outcome	Morbidity (e.g., cardio-pulmonary effects) and mortality.
Pre-Mitigation Discussion	The direction of the pre-mitigated impact is negative. Construction activities and operations could generate PM_{10} and $PM_{2.5}$ emissions that exceed localized significance (SCAQMD) thresholds.
EIR Mitigation	Limited flaring (AQ-3a), limited microturbine PM emissions (AQ-4), air monitoring plan (AQ-5d), and diesel emission requirements (AQ-7a)
Geographic Extent	Localized
Vulnerable Populations	Children, elderly, individuals with pre-existing conditions
Magnitude	Low
Adaptability	High
Likelihood	Unlikely
Post-Mitigation Health Effect	No Substantial Effect
Comments or Additional Recommended Measures	None.

The influence of the Project on $PM_{2.5}$ ground-level air concentrations is expected to be '**localized'** because air pollutant concentrations dissipate from the source**.** The vulnerable population identified for air quality impacts are **'children, the elderly and individuals with pre-existing conditions'**. Although existing concentrations of $PM_{2.5}$ may exceed air quality guidelines, the magnitude of the health effect related to $PM_{2.5}$ is '**low'**, meaning that $PM_{2.5}$ emissions are not expected to be high enough to exacerbate health risks to the community of Hermosa Beach. The adaptability is considered '**high'**, in that people are expected to be able to easily adapt to the change in $PM_{2.5}$ emissions (i.e., people will be able to maintain their pre-project level of health). The likelihood of an adverse health effect occurring as a result of the

Project's $PM_{2.5}$ emissions was defined as '**unlikely'.** Based on the findings of the Air Quality assessment and the planned mitigation measures for the Project (see Section 4.2 of the EIR), the potential $PM_{2.5}$-related health impact associated with the Project is classified as '**no substantial effect**'. Therefore, no additional measures are recommended.

5.2.3 Toxic Air Contaminants

5.2.3.1 Toxic Air Contaminants and Health

The term "toxic air contaminants" can describe a wide array of chemicals, including volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), inorganic elements (e.g., metals) and particulate emissions from diesel exhaust. Considering that there are many different types of groups of toxic air contaminants, the potential health effects associated with these compounds are accordingly diverse and can range from short-term sensory irritation to long-term, irreversible effects such as cancer. The nature and extent of the various toxic responses depend largely on the magnitude and duration of the exposures.

5.2.3.2 Current Conditions

The Multiple Air Toxics Exposure Study (MATES) is an urban toxic air pollution study that was initiated by the SCAQMD. As described in Section 4.2 of the EIR, the MATES program includes a monitoring program that uses both fixed and mobile monitoring stations, an up-to-date emissions inventory of toxic air contaminants, and exposure modeling to evaluate health risks in the South Coast Air Basin. The focus of the program is on the cancer risks associated with the toxic air contaminants.

According to the third iteration of the MATES program (i.e., MATES III), the existing carcinogenic risk from air toxics in the South Coast Air Basin is approximately 1,200 excess cancer cases per one million people, based on the average air concentrations at the MATES fixed monitoring sites. According to the MATES III study and as described in Section 4.2 of the EIR, the existing air toxics cancer risk in the general vicinity of the Project is approximately 687 excess cancer cases per one million persons. Based on the MATES II Study, in the South Coast Air Basin, approximately 94% of the cancer risk is due to emissions associated with mobile sources, with the remainder of the risk (6%) attributed to toxics emitted from stationary sources. Accounting for approximately 84% of the total risk, diesel exhaust was identified as the primary contributor to the air toxics risks.

The California Air Resources Board (CARB) reports annual summaries for select monitoring stations across the state. The closest monitoring station with data on VOCs is North Long Beach. Ambient benzene concentrations have been steadily decreasing over the last two decades. In 2012, the mean benzene concentration at North Long Beach was 0.402 ppb (or 1.28 $\mu g/m^3$). Ambient PAH air concentrations have also been on the decline. MATES III data from 2008 are used to estimate current conditions for the Hermosa Beach area. This evaluation focuses on the most carcinogenic chemical in the group of PAHs - benzo(a)pyrene. Three monitoring stations, Central LA, Rubidoux and Wilmington, monitor benzo(a)pyrene and have reported average concentrations of 0.00012, 0.00014 and 0.00018 μg/m^3, respectively (Table IV-3, SCAQMD 2008).

5.2.3.3 Project Impact

Section 4.2 of the EIR presents the findings of the human health risk assessment (HHRA) of the toxic air contaminants associated with the Project. The HHRA was conducted using the CARB Hotspots Analysis and Reporting Program (HARP) model 1.4f. HARP is a scientifically defensible method for characterizing health risks for toxic air contaminants. Its use for assessing health risks has been endorsed by the State of California and it is the recommended model for calculating and presenting HHRA results for the Hot Spots Program (CalEPA, 2003). Applicants, proponents or operators who conduct and submit an HHRA to the SCAQMD must do so according to the OEHHA Air Toxics Hot Spots Program Risk Assessment Guidelines (SCAQMD 2011). The HHRA of the Project presented in Section 4.2 and Appendix B of the EIR appeared to follow the OEHHA guidelines for assessing health risks of trace air contaminants.

In the toxic air contaminant HHRA, carcinogenic risks and non-carcinogenic risks (acute and chronic) were calculated for offsite populations, including commercial workers and residents. The toxic air contaminants considered in the HHRA include:

- VOCs, such as acetaldehyde, acrolein, benzene, 1,3-butadiene, ethylbenzene, formaldehyde, hexane, methanol, methyl ethyl ketone (MEK), propylene, styrene, toluene and xylenes;
- PAHs, such as naphthalene and benzo(a)pyrene;
- Metals, such as arsenic, cadmium, copper, lead, manganese, mercury, nickel, selenium and zinc;
- Halides, such as chlorine;
- Sulfur-containing compounds, such as H_2S; and,
- Diesel exhaust particulates.

In this type of HHRA, the carcinogenic risk is described as the incremental increase in cancer cases among people exposed over a lifetime as a result of the Project. In accordance with SCAQMD guidance, cancer risks are compared to a cancer risk threshold of 10 in one million (10×10^{-6}, or 10 excess cases of cancer per 1,000,000 people exposed). Cancer risks are calculated as shown and provided in Table 5-9.

$$\text{Cancer Risk} = \frac{\text{Incremental Exposure Estimate}}{\text{Cancer Potency Factor}}$$

Table 5-9 Predicted Cancer Risks (per one million) associated with the Project under the Mitigated Scenario

Toxic Air Contaminant	Point of Maximum Impact	Peak Residence
Acetaldehyde	0.0029	0.0020
Benzene	6.0	2.1
Diesel Exhaust Particulate	0.091	0.039
Ethylbenzene	0.0048	0.0034
Formaldehyde	0.022	0.015
Naphthalene	0.0021	0.0015
PAHs	0.090	0.064
Sum (per 1,000,000)	**6.2**	**2.2**

Non-cancer risks are expressed in terms of a hazard index (or HI), which is a ratio of the estimated exposure compared to levels at which health effects would not be expected to occur, specifically the OEHHA reference exposure levels (RELs). An HI is calculated as:

$$\text{Hazard Index} = \frac{\text{Exposure Estimate}}{\text{REL}}$$

A hazard index that exceeds the benchmark of 1.0 signifies that the exposure estimate exceeds the REL for a given chemical. The potential acute and chronic non-cancer risks, expressed as hazard indices, for the toxic air contaminants are provided in Table 5-10 and Table 5-11, respectively.

As shown, the acute and chronic hazard indices for the toxic air contaminants are less than 1.0, indicating that the maximum predicted exposure estimates are all less than their OEHHA RELs. A hazard index less than 1.0 is associated with a low health risk. Therefore, the Project is not expected to result in non-cancer health effects in the City of Hermosa Beach.

Table 5-10 Predicted Acute Hazard Indices under the Mitigated Scenario

Toxic Air Contaminant	Peak Boundary Receptor	Peak Residence
1,3-Butadiene	0.000039	0.000015
Acetaldehyde	0.0022	0.00086
Acrolein	0.0078	0.0094
Arsenic	0.00062	0.00023
Benzene	0.0057	0.0028
Chlorine	0.00000026	0.000000096
Copper	0.0000011	0.00000042
Formaldehyde	0.038	0.016
Hydrogen Sulfide (H_2S)	0.0069	0.0034
Mercury	0.000020	0.0000076
Methanol	0.00000014	0.000000054
Methyl ethyl ketone	0.000015	0.0000057
Nickel	0.000079	0.000029
Styrene	0.00000039	0.00000014
Toluene	0.00012	0.000065

Toxic Air Contaminant	Peak Boundary Receptor	Peak Residence
Xylenes	0.000013	0.000012
Sum	0.048	0.027

Given that chemical exposures rarely occur in isolation, the potential cancer and non-cancer health risks associated with the mixture of toxic air contaminants were assessed in the HHRA. Chemicals within a mixture may interact in different ways such that toxicity may be altered, possibly becoming enhanced (i.e., additivity, synergism or potentiation), reduced (i.e., antagonism) or remaining unchanged. The assessment of the health risks of chemical mixtures is challenging by virtue of the infinite number of chemical combinations that are possible.

Recent efforts have been taken by several leading scientific and regulatory authorities to better understand the types of interactions involved and to develop methods for assessing mixtures (Boobis et al., 2011; European Commission, 2012; Meek et al., 2011).

Table 5-11 Predicted Chronic Hazard Indices under the Mitigated Scenario

Toxic Air Contaminant	Peak Boundary Receptor	Peak Residence
Acetaldehyde	0.000010	0.0000013
Acrolein	0.0023	0.00022
Benzene	0.0026	0.00027
Diesel Exhaust Particulate	0.000053	0.000020
Ethylbenzene	0.0000014	0.00000014
Formaldehyde	0.00059	0.000066
Hexane	0.000090	0.0000094
Hydrogen Sulfide (H_2S)	0.00063	0.000066
Naphthalene	0.0000098	0.00000095
Propylene	0.000000018	0.0000000066
Toluene	0.00033	0.000065
Xylenes	0.000012	0.000012
Sum	**0.0039**	**0.00041**

These efforts have led to the following observations:

- Under certain conditions, chemicals can act in combination as a mixture in a manner that affects the overall level of toxicity.
- Chemicals with common modes of action can act jointly to produce combined effects that may be greater than the effects of each of the constituents alone. These effects are additive in nature.
- For chemicals having different modes of action, there is no robust evidence available to indicate that mixtures of such substances are of health or environmental concern provided the individual chemicals are present in amounts at or below their threshold dose levels.
- Interactions (including antagonism, potentiation and synergism) usually occur only at moderate to high dose levels (relative to the lowest effect levels), and are either unlikely to occur or to be of any toxicological significance at low or "environmentally relevant" exposure levels.

- If information is lacking on the mode(s) of action of chemicals in a mixture, it should be assumed by default that they will act in an additive fashion, with the manner and extent to which they may interact act determined on a case-by-case basis using professional judgment.

Based on these observations, the cancer and non-cancer risks for those toxic air contaminants that act through a common or similar toxicological mechanism and/or affect the same target tissues and/or organs in the body (i.e., share commonality in effect) were summed. In other words, the toxic air contaminants are assumed to interact in an additive fashion. As shown in Table 5-12, consideration was given to the potential additive interaction between the toxic air contaminants as carcinogens, neurotoxicants, developmental toxicants, eye irritants, immunotoxicants, reproductive toxicants, and respiratory toxicants. The predicted incremental cancer risks and non-cancer hazard indices are provided in Table 5-13 for these mixtures.

Table 5-12 Potential Additive Interactions between the Toxic Air Contaminants

Cancer Risks / Hazard Indices	Critical Effects	Chemical Mixture Constituents
Cancer	Cancer	Acetaldehyde, benzene, diesel exhaust particulate, ethylbenzene, formaldehyde, naphthalene, PAHs
Acute	CNS effects	Arsenic, H_2S, mercury, methanol, toluene, xylenes
	Developmental effects	1,3-Butadiene, arsenic, benzene, mercury, styrene, toluene
	Eye irritants	Acetaldehyde, acrolein, chlorine, formaldehyde, MEK, styrene, toluene, xylenes
	Immunological effects	Benzene, nickel
	Reproductive effects	1,3-Butadiene, arsenic, benzene, mercury, styrene, toluene
	Respiratory effects	Acetaldehyde, acrolein, chlorine, copper, MEK, styrene, toluene, xylenes
Chronic	CNS effects	Benzene, hexane, toluene, xylenes
	Developmental effects	Benzene, ethylbenzene, toluene
	Reproductive effects	Benzene, ethylbenzene, toluene
	Respiratory irritation	Acetaldehyde, acrolein, diesel exhaust particulate, formaldehyde, H_2S, naphthalene, propylene, toluene, xylenes

Maps of the acute and chronic health indices were presented as Figure 4.2-5 and 4.2-6 in Section 4.2 of the EIR. As shown in the figures and in Table 5-13, the acute and chronic hazard indices for the toxic air contaminant mixtures are less than the threshold value of 1.0, indicating that short-term and/or long-term exposure to the mixtures of toxic air contaminants is not expected to result in adverse health effects in the City of Hermosa Beach.

Table 5-13 Cancer Risks and Non-Cancer Risks for the Mixtures

Chemical Mixture	Peak Boundary Receptor	Peak Residence
Cancer risk, per million	6.2	2.2
Acute risk, hazard index		
CNS effects	0.0077	0.0037
Developmental effects	0.0065	0.0031
Eye irritants	0.048	0.027
Immunological effects	0.0057	0.0028
Reproductive effects	0.0065	0.0032
Respiratory irritation	0.010	0.010
Chronic risk, hazard index		
CNS effects	0.0030	0.00032
Developmental effects	0.0029	0.00031
Reproductive effects	0.0029	0.00031
Respiratory irritation	0.0039	0.00041

A map of the predicted post-mitigation carcinogenic risks was presented as Figure 4.2-8 in Section 4.2 of the EIR. The predicted post-mitigation carcinogenic risks are less than 10 in one million, which is the SCAQMD significance threshold for assessing incremental lifetime cancer risks. This suggests that the Project's emissions are not expected to pose a significant cancer risk to the residents of Hermosa Beach.

Although the acute and chronic non-cancer risks did not account for the potential additive effects of NO_2 on respiratory irritation, inclusion of the maximum acute hazard index of 0.77 at the Point of Maximum Impact (i.e., 154.2 µg/m³/200 µg/m³) and 0.74 for the peak residential location (i.e., 149.3 µg/m³/200 µg/m³) for NO_2 would not result in an exceedance of the threshold value of 1.0. The maximum acute hazard index for the respiratory irritants, including NO_2, would be 0.78 and 0.75 at the PMI and peak residential location, respectively. On a chronic basis, inclusion of NO_2 in the respiratory irritants mixture would result in a maximum hazard index of 0.58 at the PMI and 0.55 at the peak residential location, both of which are below the threshold value of 1.0.

For the reasons stated, the health risks associated with the Project's emissions of toxic air contaminants are expected to be low. The impact of Project-related TAC emissions on the health of the community is provided in Table 5-14. As described in Table 5-14, without mitigation, the Project's emissions of certain toxic air contaminants would exceed the SCAQMD regional thresholds. Pre-mitigation cancer risks would also exceed the threshold value of 10 in one million.

Table 5-14 HIA Evaluation Matrix – Toxic Air Contaminants (TAC)

Health Determinant	Toxic Air Contaminants (TAC)
Potential Health Outcome	Varies for the TACs. Includes acute effects, chronic non-carcinogenic and carcinogenic effects.
Pre-Mitigation Discussion	The direction of the potential pre-mitigated impact is negative. Toxic Air Contaminant (TAC) emissions from operations would be associated with combustion sources (e.g., flares and microturbines) and fugitive emissions. Emissions of volatile organic compounds (VOCs) would exceed the SCAQMD regional thresholds, due primarily to fugitive emissions from tanks, valves and components of muds off-gassing during drilling. Predicted unmitigated cancer risks exceed threshold value of 10 in 1,000,000. Acute and chronic health indices (i.e., non-carcinogenic risk estimates) are below the threshold values of 1.
EIR Mitigation	Air quality mitigation measures (AQ-1a, AQ-1b, AQ-3a, AQ-3b, AQ-4, AQ-5a through AQ-5f, AQ-6, AQ-7a, AQ-7b)
Geographic Extent	Localized
Vulnerable Populations	Children, elderly, individuals with pre-existing conditions
Magnitude	Low
Adaptability	High
Likelihood	Unlikely
Post-Mitigation Health Effect	No Substantial Effect
Comments or Additional Recommended Measures	Cancer risks, chronic non-cancer risks and acute risks will be below threshold values post-mitigation.

The Project will comply with a range of air quality mitigation measures and permits, including component monitoring for leaks, combustion equipment emission limits, restrictions on venting, etc. All diesel equipment used at the site will meet EPA Tier 3 emission guidelines, and be fitted with a CARB Level 3 diesel particulate filter to reduce diesel PM emissions. These mitigation measures were described in detail in Section 4.2.4.1 of the EIR.

The influence of the Project on TAC ground-level air concentrations is expected to be '**localized'** because air pollutant concentrations dissipate from the source**.** The vulnerable population identified for air quality impacts are **'children, the elderly and pre-existing conditions'**. The magnitude of the health effect from the Project's contribution to the TAC air concentrations is '**low',** meaning that they are not expected to be high enough to pose a health risk to the residents of Hermosa Beach. The adaptability is considered '**high',** in that people are expected to readily be able to adapt to the change in TAC emissions (i.e., people will be able to maintain their pre-project level of health). The likelihood of an adverse health effect occurring as a result of the Project's TAC emissions was defined as '**unlikely'.** Based on the findings of the Air Quality assessment and the planned mitigation measures for the Project (see Section 4.2 of the EIR), the potential TAC-related health impact associated with the Project is classified as '**no substantial effect**'. Therefore, no additional measures are recommended.

5.2.4 Odor

5.2.4.1 Odor and Health

Sensitivity to environmental odors varies greatly from person to person. Young children, the elderly, and pregnant women may be more sensitive to odors. In general, the most commonly reported symptoms from odor exposure are headaches, nasal congestion, eye, nose, and throat irritation, hoarseness, sore throat, cough, chest tightness, shortness of breath, wheezing, heart tremors (palpitations), nausea, drowsiness, and depression (ATSDR, 2014). According to the WHO, odor annoyance can also affect overall quality of life. Adverse health outcomes associated with odor are related to the frequency, duration, concentration, and the individuals' level of sensitivity (ATSDR, 2014).

Several compounds associated with oil and gas development can produce odors. In particular, the sulfur compounds tend to have very low odor threshold levels (e.g., the rotten eggs smell from hydrogen sulfide). Naphthalene is another compound found in crude oil that has a low odor threshold usually described as a "mothball" odor. Volatile organic compounds (VOCs) also known as "aromatics" can have a "sweet" or "chemical" smell or a "gas station" odor.

Hydrogen sulfide is the primary odor associated with oil and gas production and is the one with the lowest odor threshold. The hydrogen sulfide (H_2S) odor threshold (*i.e.,* the lowest concentration perceivable by human smell) is highly variable within the human population. It can be detected by humans at concentrations as low as a half of a part per billion (0.5 ppb) by two percent of the population. It is estimated that 50% of humans could detect the odor of H_2S at 8 ppb, while over 90% could detect the odor at 50 ppb and virtually everyone could detect H_2S at 200 ppb (Collins and Lewis, 2000).

The toxicological effects of H_2S inhalation are well studied, and can vary dramatically from minor effects (*i.e.,* runny nose, eye and throat irritation) at lower concentrations to severe effects (*i.e.,* respiratory paralysis, unconsciousness, and death) at much higher concentrations (see Section 5.2.3.3 for toxicological-based hazard indices from exposure to the proposed Project H_2S emissions). The toxicological effects of H_2S begin at 2,000 ppb which may include nausea, tearing of the eyes, headaches and bronchial constriction in some asthmatics. To account for uncertainty in human variability, the minimal risk level for acute-duration inhalation health concerns is listed as 700 ppb (ATSDR, 2006). This means most people can begin to smell H_2S well below the concentrations known to cause direct toxicological effects (MOE, 2007; WHO, 2003). To avoid odor annoyance, the WHO advises ambient concentration levels should not exceed 5 ppb, with a 30 minute averaging time (WHO, 2000).

Distinguishing between nuisance odor and health symptoms related to odor exposure continues to be a gray area.

Chemicals that have been implicated for eliciting adverse outcomes associated with odors include hydrogen sulphide, ammonia, mercaptans, methyl sulphide, methyl disulphide, and other reduced sulphur compounds as well as malodorous VOCs that can be emitted from facilities such as waste treatment lagoons, solid waste landfills, land spreading operations, pulp and paper mills, petroleum refineries, smelters, confined animal feeding operations, tanneries and rendering facilities.

Recent epidemiological studies have shown that people living in communities neighboring facilities that emit unpleasant or annoying odors on a regular or continuous basis often experience higher than normal incidences of physical symptoms, including sensations of irritation, respiratory problems, gastrointestinal problems, sleep disturbances, headaches, and hypertension, as well as psychological/behavioral symptoms such as irritability, tension, nervousness, anger, frustration, embarrassment, depression, fatigue, confusion and negative moods. The presence of such odors also has been reported to interfere with people's daily activities, use of property, social interactions, and quality of life as well as contributing to fears and anxiety over chronic diseases and property values (Heaney *et al.,* 2011; Horton *et al.,* 2009; Schinasi *et al.,* 2011; Wing *et al.,* 2008, 2013). Adverse outcomes are most prevalent when the odors occur in an episodic and unpredictable manner, contributing to a sense of helplessness and lack of control that fosters feelings of frustration, anger and/or anxiety.

The nature and extent of the adverse outcomes reported in these studies should be interpreted with some caution since oftentimes the people recruited for the investigations were involved in citizen action groups or were participants in class-action lawsuits, introducing the possibility of selection bias. In addition, the communities surveyed were often of low or very low socio-economic status, introducing determinants apart from odors (*e.g.*, living conditions, education level, diet, access to medical care) that are associated with health and well-being and; therefore, may have confounded the results.

Given the fact that the odor threshold for sulfur compounds is so much lower than the level that could cause direct toxicological effects, it is likely that the explanation for health symptoms involves odor-related mechanisms. An investigation into the apparent health impacts of odors on communities concluded that there may be a number of explanations, including: the exacerbation of an underlying medical condition, innate odor aversion, aversive conditioning, pre-existing psychological conditions (e.g., hypochondriasis or somatization disorder), among others (Schusterman, 1992).

5.2.4.2 Current Conditions

The neighborhood around the proposed Project Site (the present City Yard) is mixed use residential, commercial, and light industrial with minimal existing odor sources. There are no known industrial or natural (i.e., geothermal) sources of H_2S currently in the City.

As described in Section 5.2.4.1, the most commonly reported symptoms from odor exposure are headaches, nasal congestion, eye, nose, and throat irritation, hoarseness, sore throat, cough, chest tightness, shortness of breath, wheezing, heart tremors (palpitations), nausea, drowsiness, and depression (ATSDR, 2014). The current frequency at which Hermosa Beach residents experience the listed symptoms is unknown.

5.2.4.3 Project Impact

According to the EIR, emissions during oil production operations (including testing, drilling and production phases) have the potential to create odors in the neighborhood adjacent to the Project Site. Odor emission sources associated with operational activities include onsite microturbines used to generate onsite electricity, routine and emergency flaring events, and volatile fugitive emissions from valves, compressors, pumps and connections. Drilling muds that contain hydrocarbons can surface and release hydrocarbon vapors (referred to as “mud off-gassing”). Drilling muds may contain H_2S, benzene and other volatile contaminants, which are odiferous compounds. Upset conditions and leaking equipment components could also release odors. Additionally, the compounds used to odorize natural gas (often mercaptans) also contain sulfur compounds and, similar to H_2S, have very low odor thresholds.

The occurrence of six or more odor complaints associated with the proposed Project facility was the threshold for determining a significant odor impact in the EIR. As reported in the EIR, odors from both normal operations as well as odors associated with accidental releases are considered potentially significant impacts without mitigation. Mitigation measures, as detailed in Section 4.2.4.4 of the EIR and summarized below, require the Applicant to:

- Flare gases encountered during drilling;
- Collect or flare vapors from seal leaks;
- Develop and implement an Odor Minimization Plan which gives the City the authority to enforce contingency measures to eliminate nuisance odors;
- Monitor hydrogen sulfide and hydrocarbon vapors with automatic alarms that will be triggered at 5 and 10 ppm H_2S;
- Use odor suppressant or carbon capture canisters when odors cannot be controlled by others means; and,
- Utilize leak detection and reporting to minimize leaking components.

Mitigation would likely reduce the frequency of odor releases. However, odor impacts reported in the EIR remain significant and unavoidable because the close proximity of residences, businesses, and public areas to the Project Site means small releases could generate odor complaints. Odors would be limited to the immediate vicinity of the Site and would not be expected to occur beyond 500-1,000 feet except for during an accident scenario (MRS, 2014).

The release of offensive smelling odors introduces the possibility that certain individuals might experience health effects unrelated to the toxicity of the chemicals contained in emissions, but associated with the unpleasant odors themselves. As described in Section 5.2.4.1, studies have indicated the presence of unpleasant odors can contribute to a number of physical and psychological/behavioral symptoms, possibly related to the nuisance caused by the odors, especially if the annoyance escalates to feelings of frustration and aggravation. Adverse health outcomes from odors are commonly associated with facilities known for having higher and more continuous/frequent emissions of odorous compounds, such as pulp and paper-mills, confined animal feeding operations and solid waste landfills.

The impact of project-related odors on the health of the community is provided in Table 5-15.

Table 5-15 Air Quality Assessment: Odors

Health Determinant	Odors
Potential Health Outcome	Acute health symptoms from odorous compounds in crude oil
Pre-Mitigation Discussion	Negative health outcomes may occur during all phases
EIR Mitigation	AQ-3b to reduce off-gassing of vapors from drilling muds and AQ-5a through AQ-5f for operational odor controls including an Odor Minimization Plan
Geographic Extent	Localized
Vulnerable Populations	Odor sensitive individuals
Magnitude	Medium
Adaptability	Low
Likelihood	Possible
Post-Mitigation Health Effect	Negative
Comments or Additional Recommended Measures	Periodic discomfort and annoyance from odor releases is likely. If frequent reports of odor occur, additional study and/or periodic monitoring of odor may be warranted.

As described in Table 5-15, without mitigation, the health outcome from project related odors would be negative because odor releases could occur with sufficient frequency to result in adverse health outcomes among community members. The extensive mitigation measures proposed in the EIR will likely reduce number of odor releases, although, detectable offsite odor concentrations could still occur during small upset releases. Odors would be limited to the immediate vicinity of the Site (500 to 1,000 feet) so the geographic extent is expected to be **'localized'** (except in the event of an accident). The vulnerable population identified for odor impacts are **'odor sensitive individuals'**. The post-mitigation magnitude of an adverse health impact from odor is **'medium'** because odors will be detectable, and pose a minor to moderate hazard to health**.** Adaptability is considered to be **'low'** since people may not be able to adapt to the odor releases while maintaining pre-project level of health. Health symptoms related to odor could occur in sensitive individuals; therefore, likelihood of health impact is considered **'possible'**. Periodic discomfort and annoyance from odor releases is likely. Based on the fact that odor releases cannot be completely mitigated and adverse health outcomes could occur, the potential odor-related health impact associated with the Project is classified as '**negative**' among community members in the immediate vicinity of the Site. Although not anticipated, in the case that reports of odor become frequent, additional studies and/or air monitoring of odor may be warranted.

5.2.5 Summary and Conclusions of Air Quality

The potential for air emissions from construction and operation of the proposed Project to affect air quality in Hermosa Beach was evaluated using the emissions inventory produced as part of the EIR. Emissions associated with the Project and modeled in the EIR include criteria pollutants (e.g., carbon monoxide, nitrogen dioxide, sulfur dioxide and particulate matter), volatile organic compounds (VOCs) and other toxic air contaminants (e.g., polycyclic aromatic hydrocarbons (PAHs) and metals), and odorous / toxic compounds (e.g., hydrogen sulfide or H_2S). Carbon monoxide (CO) and sulfur dioxide (SO_2) were not carried forward in the HIA as the calculated emission estimates for these criteria pollutants were determined to be below the South Coast Air Quality Management District (SCAQMD) regional and local thresholds.

The air quality assessment within the HIA concludes that with implementation of the proposed EIR mitigation measures there is no substantial effect on human health with respect to air emissions (NO_2, PM and TAC). However, periodic odor releases, identified in the EIR as significant and unavoidable, were characterized as negative near the Project Site. Odor can have various health consequences, and could result in periodic discomfort and annoyance near the Project Site.

Nitrogen dioxide (NO_2) has the potential to produce a range of respiratory effects depending on the concentration in air (e.g., eye, nose and throat irritation, inflammation of lung tissue). For the assessment, the maximum 1-hour and maximum annual average NO_2 air concentrations were calculated (background plus Project) and found to be below the WHO air quality health guidelines, indicating that adverse health effects are not expected to result from either short-term or long-term exposure. Additionally, there were no exceedances of California's Ambient Air Quality Standards (AAQS), or the US EPA National Ambient Air Quality Standards (NAAQS) for NO_2. Therefore, it was concluded that exposure to NO_2 from the proposed Project (with mitigation) is expected to have 'no substantial effect' and no additional recommendations were required.

Particulate matter (PM) is a widespread air pollutant composed of a mixture of solid and liquid particles, and its effects on health are well documented. Particles with a diameter of 10 micrometers or smaller are referred to as PM_{10}, and particles with a diameter of 2.5 micrometers or smaller are known as $PM_{2.5.}$ PM exposure, particularly to the smaller $PM_{2.5}$ particles, is associated with increased respiratory and cardiovascular disease and mortality. The maximum 1-hour and maximum annual average $PM_{2.5}$ air concentrations were added to the baseline concentration for LA County and resulted in exceedances of the WHO air quality guidelines. However, when background levels from South Coastal Los Angeles County (assumed to better represent Hermosa Beach air quality) were used, the Project was below the California annual AAQS or US EPA NAAQS. The assessment concluded that any exceedances of the WHO air quality guidelines are based on existing background levels in the area and the Project is not expected to have a material impact on existing $PM_{2.5}$ related health risks. While there is no substantial effect from post-mitigation exposure to $PM_{2.5}$ from the proposed Project, existing ambient levels of $PM_{2.5}$ air concentrations in the area are in the range at which increased mortality has been observed in large urban centers.

Toxic Air Contaminants (TAC) can be used to describe a wide array of chemicals, including volatile organic compounds (VOCs), polycyclic aromatic hydrocarbons (PAHs), inorganic elements (e.g., metals) and particulate emissions from diesel exhaust. Without mitigation measures, Project emissions of certain TAC would pose a potential risk to human health; however, with implementation of the measures proposed in the EIR, the proposed Project is expected to have no substantial effect and no additional recommendations were required.

Odor can result from the release of compounds such as hydrogen sulfide (H_2S). Sensitivity to environmental odors varies greatly from person to person. The most commonly reported symptoms from odor exposure are headaches, nasal congestion, eye, nose, and throat irritation, hoarseness, sore throat, cough, chest tightness, and shortness of breath, among others. According to the WHO, odor annoyance can also affect overall quality of life. Adverse health outcomes associated with odor are related to the frequency, duration, concentration, and the individuals' level of sensitivity. Hydrogen sulfide is the primary odor associated with oil and gas production and is the one with the lowest odor threshold. The H_2S odor threshold (*i.e.,* the lowest concentration perceivable by human smell) is highly variable within the human population. Although mitigation measures proposed in the EIR would reduce the frequency of odor releases, they were still identified as 'significant and unavoidable' because of the close proximity of residences and businesses to the Project. For these reasons, the post-mitigation health effect is considered 'negative' near the Project Site and additional recommendations have been provided (i.e., an odor study and/or periodic monitoring in the event of excessive reports of odor).

5.3 Water and Soil Quality

This section assesses the potential health impacts of two exposure pathways that could pose a risk to residential, commercial and recreational community members:

1. Discharge of wastewater and surface water runoff during construction and operations; and,
2. Deposition of windblown soil particulates to offsite surface soil.

5.3.1 Surface Water

5.3.1.1 Surface Water and Health

As rain water runs over impervious surfaces (paved areas where water cannot soak into soil), it can pick up oil and grease residues, concrete washout water, heavy metals, and debris. During heavy rain events the stormwater and runoff enters storm drains which outfall to the Pacific Ocean. Untreated storm runoff can be a significant source of beach water pollution and people who swim in water near storm drains may experience health effects.

An epidemiological study conducted in Santa Monica Bay examined the health effects of swimming in ocean water contaminated by storm drain runoff (Haile et al., 1999). The study included over 11,000 swimmers, categorized according to swimming location distance to a storm drain (0, 1-50, 51-100, or 400 yards), who subsequently participated in a follow-up interview 9 to 14 days after swimming to ascertain the occurrence of a number of symptoms including fever, chills, eye discharge, earache, ear discharge, skin rash, infected cut, nausea, vomiting, diarrhea, stomach pain, cough, runny nose, and sore throat. The findings revealed that individuals who swim in areas adjacent to storm drains were approximately 50 percent more likely to develop symptoms compared to those who swim 400+ yards away (Haile et al., 1999). Increases in risks were greatest for fever, chills, ear discharge, coughing, gastrointestinal illness, and significant respiratory disease. The authors concluded that there may be an increased risk for a broad range of adverse health effects associated with swimming in ocean water subject to urban runoff. However, increases in symptoms were also associated with high levels of bacterial indicators and waters where human viruses were present. This suggests that sources of exposure in urban runoff associated with adverse health outcomes are likely related to pathogens (from human and animal waste) rather than chemical pollutants from industrial processes.

If uncontrolled, Project-related chemicals (petroleum products) in polluted stormwater runoff water could be harmful to the environment and human health. For people swimming or recreating in the Pacific Ocean, contact with polluted stormwater runoff could result in acute health symptoms such as eye and skin irritation. The effects of contact or ingestion of contaminated water are much greater in vulnerable populations such as children, the elderly, and those with compromised immune systems.

5.3.1.2 Current Conditions

The City of Hermosa has two miles of beach within the larger Santa Monica Bay that stretches north to Malibu and south to Palos Verdes Peninsula, and the proposed Project Site is located less than half a mile from the beach. The entire Santa Monica Bay and its beaches are listed as impaired under Section 303(d) of the Clean Water Act because the surface waters do not meet federal water quality standards. The impairments are due to the human health risks associated with consumption of DDT and PCB impacted aquatic life, and the recreational health risks due to the presence of coliform bacteria (USEPA Region 9, 2012).

As described in the baseline health assessment (Appendix E), the presence of coliform bacteria in the Santa Monica Bay is an indicator that water quality may not be sufficient to use waters for recreation. To address the problem of bacteria in the water, the Los Angeles Regional Water Quality Control Board established the Santa Monica Bay bacteria Total Maximum Daily Load (TMDL) in 2003. The TMDL requires cities to improve water quality through compliance with targets for bacteria in surface water. The City of Hermosa Beach's stormwater pollution prevention program is a multifaceted program designed to reduce runoff and ensure compliance with the TMDL. Efforts of the Hermosa stormwater pollution prevention program include infiltration projects, low flow diversion to sanitary sewer, and a grease control ordinance (SBSP, 2013).

Runoff from the proposed Project site generally flows to the west towards an inlet that discharges to the Ocean at an outfall at the end of Herondo Street (MRS, 2014). The Herondo storm drain collects runoff from more than 2,000 acres, of which less than 300 acres are within the City of Hermosa Beach. To reduce impacts to water quality at the beach from non-stormwater runoff (e.g., overwatering of lawns, irrigation overspray onto the sidewalk, etc.), low flows are diverted from the storm drain to the sanitary sewer during dry weather to provide treatment and prevent discharge of urban runoff from this large drainage system onto Hermosa Beach (South Bay Stormwater Program, 2013).

5.3.1.3 Project Impact

If uncontrolled, construction activities to build the proposed oil and gas development facility and the pipeline corridors could result in discharge of contaminants and debris into surface runoff. During a rain event, contaminants and debris that enter the storm drain system could flow into the nearby Santa Monica Bay, which is currently listed as an "impaired water body" for 'contact' recreation. Potential construction-related contaminants that could impact offsite surface water include sanitary wastes, phosphorous, nitrogen, oil and grease residues, concrete washout water, heavy metals, debris, and incidental releases of oil, oil-based mud, generator fuel, or maintenance related hazardous materials (MRS, 2014). Swimming in close proximity to storm drains is associated with a number of acute health symptoms including fever, chills, ear discharge, coughing, gastrointestinal illness, and respiratory disease (Haile, 1999). Because the Project Site falls within a drainage area that is over six times larger than the area of Hermosa Beach, health effects to those swimming in ocean water after a rain event could be attributed to various sources, and it would be difficult to determine a specific source of contamination. When there is a significant rainfall (> 0.1 inch), the California Department of Public Health issues an advisory for beachgoers to avoid water contact for a period of 72 hours after the rainfall (LACDPH, 2012). It is advisable that community members follow the recommendations when public health advisories for beachgoers are issued.

During Phase 2 and 4 drilling operations, surface runoff at the Project site would be contained with walls and berms and pumped into the water processing system for injection into the oil reservoir; therefore, preventing negative impacts to surface water quality and potential health outcomes during operations. However, during Phase 1 and 3 construction on the proposed Project Site, pipeline construction, and implementation of the Remedial Action Plan to address known contaminated soil beneath the current site, impacts are considered potentially significant by the EIR (MRS, 2014). As a result, the EIR recommends the mitigation measures (HWQ 1-1a to 1-1g) for the development of a Storm Water Pollution Prevention Plan (SWPP) to reduce construction-related water quality impacts. The Applicant shall develop the SWPPP in accordance with the State General Construction Permit and the Los Angeles Regional Water Quality Control Board.

The impact of Project-related runoff to surface water on the health of the community is provided in Table 5-16.

Table 5-16 Water and Soil Quality Assessment: Surface Water

Health Determinant	Surface water
Potential Health Outcome	Acute health symptoms
Pre-Mitigation Discussion	Negative health outcomes may occur during Phases 1 and 3
EIR Mitigation	Storm Water Pollution Prevention Plan (HWQ 1-1a to 1-1g)
Geographic Extent	Localized
Vulnerable Populations	Beach users
Magnitude	Medium
Adaptability	Medium
Likelihood	Unlikely
Post-Mitigation Health Effect	No substantial effect
Comments or Additional Recommended Measures	None

Without mitigation, construction-related contaminants and debris flowing into storm drains connected to the Pacific Ocean could result in impacts to water quality and increases in acute health outcomes during Phases 1 and 3 of the proposed Project (Table 5-16). However, EIR mitigation measures will reduce the possibility of construction-related impacts to the Pacific Ocean through the requirement of a Storm Water Pollution Prevention Plan.

Based on findings in the literature, potential impacts on surface water (and associated acute health symptoms) are limited to a '**localized'** group of individuals who may be swimming in closest proximity to the Herondo storm drain after a rain event. The vulnerable population identified for surface water impacts are **'beach users'**. The magnitude is classified as '**medium**' since the potential acute health outcomes would be detectable, reversible and pose a minor to moderate hazard to health. The adaptability is classified as ‘**medium**’ given that most people can adapt to the change in their environment by avoiding swimming near the storm drain, although others may be unaware of its location. The likelihood was defined as ‘**unlikely**’ since Site runoff will be controlled throughout all phases of the proposed Project to prevent surface water releases to the Ocean. Overall, the potential health impact associated with surface water is classified as ‘**no substantial effect**’ due to the preventative measures which will be implemented. Therefore, based on findings from the surface water assessment, no additional measures are recommended.

5.3.2 Soil Particulates

5.3.2.1 Soil Particulates and Health

Windblown soil particulates may contain various chemicals of human health concern. Particulate emissions during construction are produced when equipment moves on soil or unpaved surfaces and during trenching, grading, and other earth-moving activities. People can then be exposed to these particulates when they inhale, through incidental ingestion of dust, or in rare cases, children may intentionally consume soil (a behavior called pica). Depending on the naturally occurring and anthropogenic components of soil, particulates can present varying degrees of human health risk.

5.3.2.2 Current Conditions

Soil data to characterize current conditions are not available for areas surrounding the Site, such as the Ardmore/Valley Greenbelt area, residential yards, or other parks such as Clark Field. The only information available on soil conditions exists for the current City Maintenance Yard. Brycon completed a site investigation in 2012 that focused on characterizing the extent of the contamination related to the former landfill, as well as possible impacts from current maintenance yard activities. Soil sampling was conducted to characterize the extent of onsite petroleum-related contaminants; including benzene, VOCs, and lead. The extent of shallow soil sampling in the upper 2 feet was very limited during this investigation, however one soil sample collected at 3-feet below ground was identified to have diesel-range hydrocarbons present at a concentration of 3720 mg/kg, which is above the commercial human health screening levels of 2400 mg/kg (RWQCB, 2013). Concentrations of TPH motor oil, BTEX, and other VOCs were not found above health-based screening levels. PAHs in soil (with the exception of naphthalene) were not analyzed.

Metals were analyzed in 26 soil samples, and lead was identified as an onsite contaminant of concern. The maximum lead concentration of 9,680 mg/kg was identified from a soil sample collected from 15-feet below ground; this concentration is above both the residential and commercial scenario soil screening levels of 80 mg/kg and 320 mg/kg, respectively, established by the Office of Environmental Health Hazard Assessment (CalEPA, 2009). The ground surface at the City Maintenance Yard is currently paved, which means there is presently no human exposure pathway to any soil contamination related to the former landfill. However, lead and other site-related contaminants have the potential to travel offsite during site preparation in Phase 1 for the proposed Project if proper dust suppression is not employed.

5.3.2.3 *Project Impact*

As described above, the onsite soil is currently impacted by former landfill activities and the primary contaminant of concern in onsite soil is lead. The proposed Project describes that, during Phase 3, the Remedial Action Plan (RAP) would be implemented to remove contaminated soil up to a depth of 15 feet below ground within the former landfill area. However, construction activities prior to Phase 3 could result soil emissions and exposure to people offsite. For example, the Site will be graded to depths of 1 to 3 feet during Phase 1 of the proposed Project. During this time, people could come into contact with windblown particles from the exposed top 3 feet of soil.

On-site surface soil data is limited and the top 3 feet of soil is not currently well characterized with respect to potential contamination. Therefore, additional surface soil data is important to address in order to determine the potential health hazard posed by chemicals in soil prior to Phase 3 RAP activities. The EIR required mitigation measure SR-2 addresses this data gap by requiring the Applicant to sample soil during Phase I grading to ensure that Site soil lead concentrations are below 9,500 mg/kg and that total petroleum hydrocarbons (TPH) are also below regulatory thresholds. Soil contamination exceeding regulatory thresholds should be removed from the Site. Removal of contaminated soil and implementation of the RAP will likely occur during Phase 3 of the proposed Project but the mitigation measure (SR-2) states that remediation could occur during Phase 1 if substantial contamination is encountered (MRS, 2014). The RAP will be implemented under the appropriate regulatory oversight agency.

Regardless of the extent of current soil contamination, the EIR mitigation measure AQ-1a requires the Applicant to submit and implement a Fugitive Dust Control Plan that includes SCAQMD mitigations for fugitive dust mitigation, including applying water on unpaved areas during construction, tarping of trucks hauling dirt, limit on-site vehicle speeds, etc. Surface water controls (berming the Site and measures discussed in Section 5.3.1.3) will also prevent the runoff of soil particles offsite. The impact of Project-related soil particulates on the health of the community is provided in Table 5-17.

Table 5-17 Water and Soil Quality Assessment: Soil Particulates

Health Determinant	Soil Particulates
Potential Health Outcome	Varying degrees of human health risk
Pre-Mitigation Discussion	Depending on chemicals of concern in the soil, soil particulates may pose a hazard off-site without mitigation
EIR Mitigation	Fugitive Dust Control Plan (AQ-1a) and Soil Sampling (SR-2)
Geographic Extent	Localized
Vulnerable Populations	Children
Magnitude	Unknown
Adaptability	Unknown
Likelihood	Unlikely
Post-Mitigation Health Effect	No substantial effect
Comments or Additional Recommended Measures	None

As described above, without removal of contaminated soil and/or mitigation measures to reduce fugitive dust emissions, soil particulate emissions during Project related activities could result in human health hazards. These measures will reduce the possibility of impacts to community health.

Potential inhalation or incidental ingestion of contaminated soil (and the associated health hazards) is limited to a '**localized'** group of individuals who may be within the immediate vicinity of the proposed Project Site where dust emissions would potentially be present. The vulnerable population identified for soil impacts are **'children'**. The magnitude and adaptability are classified as '**unknown**' because the severity of the health outcome depends on the components and level of the contamination of the soil. The likelihood of soil-related health impacts to the community was defined as '**unlikely**' because preparation of the Site includes implementation of a RAP to address current Site contamination which will happen under the oversight of the appropriate regulatory agency. Overall, the potential health impact associated with soil particulates is classified as '**no substantial effect**' due to the preventative measures which will be implemented. Therefore, based on findings from the soil assessment, no additional measures are recommended.

5.3.3 Summary and Conclusions for Water and Soil Quality

If uncontrolled, Site-related chemicals in polluted stormwater runoff water could be detrimental to the environment and human health. For people swimming or recreating in the Pacific Ocean, contact will polluted stormwater runoff could result in acute health symptoms such as eye and skin irritation. Runoff from the proposed Project site generally flows to the west towards an inlet that discharges to the Ocean at an outfall at the end of Herondo Street. During a rain event, contaminants and debris that enter the storm drain system could flow into the nearby Santa Monica Bay, which is currently listed as an "impaired water body" for 'contact' recreation. During Phase 2 and 4 drilling operations, surface runoff at the Project site would be contained with walls and berms and pumped into the water processing system for injection into the oil reservoir; therefore, preventing negative impacts to surface water quality and potential health outcomes during operations. Without mitigation, construction-related contaminants and debris flowing into storm drains connected to the Pacific Ocean could result in impacts to water quality and increases in acute health outcomes during Phases 1 and 3 of the proposed Project. However, EIR mitigation measures will reduce the possibility of construction-related impacts to the Pacific Ocean through the requirement of a Storm Water Pollution Prevention Plan. Overall, the potential health impact associated with surface water is classified as no substantial effect because Site runoff will be controlled during all Project phases.

The water and soil quality assessment within the HIA concludes that with implementation of the proposed EIR mitigation measures, there is no substantial effect on human health with respect to surface water quality and soil particulates.

Soils under the current maintenance yard and potential Project Site have contamination related to its former use as a landfill. While the Site is currently paved over and thus not posing any present hazard, Project-related construction activities will release particulate emissions when equipment moves on soil or unpaved surfaces and during trenching, grading, and other earth-moving activities. The primary contaminant of concern in onsite soil is lead; however, on-site surface soil data is limited and the top 3 feet of soil is not currently well characterized with respect to potential contamination. Therefore, additional surface soil data is important to address in order to determine the potential health hazard posed by chemicals in soil prior to Phase 3 RAP activities. The EIR required mitigation measure SR-2 addresses this data gap by requiring the Applicant to sample soil during Phase I grading and remove soil contamination exceeding regulatory thresholds from the Site as early as Phase 1 if substantial contamination is present. Implementation of the RAP to remove contaminated soil and mitigation measures to reduce fugitive dust emissions will reduce the possibility of hazardous soil particulate emissions during Project- related activities and thus soil particulates do not pose a substantial effect to human health.

5.4 Upset Scenarios

This section assesses the potential health impacts of two upset scenarios: an oil spill and a well blowout. Due to the unique nature and rarity of such events occurring they were placed in a separate health assessment category.

5.4.1 Oil Spill

5.4.1.1 Oil Spill and Health

An oil spill related to the proposed Project could have various health consequences. A major pipeline accident in 2010 spilled 840,000 gallons of crude oil into the Kalamazoo River in Michigan (MDCH, 2013). Community members surveyed immediately following two oil spill events reported headaches, eye/skin irritation, respiratory conditions, anxiety, and depression (UDOH, 2011; MDCH, 2013). Emergency response and cleanup efforts following pipeline oil spills are effective in limiting the public's exposure to crude oil contaminants. Human health risk assessments of soil and surface water following cleanup of pipeline ruptures indicate that residual chemical levels found in the environment are not expected to cause long-term harm to public health. However, oil spill cleanup workers are known to experience a range of symptoms due to direct contact with crude oil during emergency response activities.

Potential indirect health impacts of oil spills may include elevated levels of anxiety and depression, resulting from either the perceived risk of a potential upset or from an actual spill event. Psychological impacts of the Deepwater Horizon oil spill on Florida and Alabama communities have been described, particularly among business owners who experienced economic loss associated with community oil exposure (Grattan et al., 2011). As discussed in Section 3.1, the fear of an accidental explosion or oil spill was the concern ranked highest among the community. This indicates potential stress related to the fear of an environmentally devastating oil spill.

People who might be in the area at the time of a spill would be unlikely to experience health effects other than minor, transient sensory and/or non-sensory effects, including: discomfort, irritability, mild irritation of the eyes, nose and throat, cough, headache, lightheadedness, vertigo, dizziness, and/or nausea. Odors could be apparent to some individuals, especially sensitive individuals. The odors would be dominated by a hydrocarbon-like smell, with some potential for other distinct odors due to the presence of sulfur-containing chemicals in the vapor mix. The odors could contribute to added discomfort and irritability among those exposed.

Additionally, large oil spills can impact fish consumption advisories and local economies that depend on fish and seafood commerce. Long-term effects of oil spills have not been well studied; this gap in public health knowledge has been acknowledged by the scientific community since the 2010 Deepwater Horizon oil spill occurred (Woodward, 2010) and is currently being addressed by the Gulf Long-term Health Follow-up Study.

5.4.1.2 Current Conditions

Currently there are no oil and gas operations in the City of Hermosa or in the immediate vicinity. Potential risks posed by the current city maintenance yard include small spills of oil, accidents related to releases from vehicle gasoline tanks, or releases from the onsite propane tank (MRS, 2014). However, as no large quantities of materials are stored at the current city maintenance yard, spill potential is minimal and unlikely to affect areas offsite.

5.4.1.3 Project Impact

Information from the EIR (Section 4.8) was reviewed to identify the probability and extent of a crude oil spill related to Proposed Project activities. That information, as summarized below, was considered in order to evaluate the potential human health impacts of an offsite spill that reaches the beach and/or ocean.

A crude oil spill could occur either on the Project Site, from the crude oil pipeline, or from trucks transporting oil during Phase 2 (through parts of Hermosa Beach, Manhattan Beach, Redondo Beach, and Torrance) (MRS, 2014) A spill from equipment on the Project Site is unlikely to impact the community because the Site will be completely contained. While pipelines are generally regarded as a safe way to transport oil, pipeline accidents can occur. The pipeline for transporting crude oil offsite could leak or rupture and depending on the location along the pipeline length, the volume of oil in the pipeline, and the draining potential (the elevation of the rupture in relation to elevation of Project Site), the oil spill could enter storm drains that flow to the ocean outfall on the beach (MRS, 2014). The EIR estimated a worst case spill volume of about 16,000 gallons from a pipeline rupture at Herondo and Valley Drive, which could enter the storm drain and impact the ocean.

A spill from a truck, which has a capacity of about 6,700 gallons of oil, could also be directed into the storm drain system. However, a spill entering a storm drain would require storm flows during a rain event in order to actually reach the ocean. The EIR calculated that the probability of any oil spill occurring during a 0.50 inch storm event in the Horondo Street area would be 0.07% over the life of the Project. In the case of a spill, the Oil Pipeline Environmental Responsibility Act requires any pipeline corporation to immediately clean up all crude oil that leaks or is discharged from a pipeline (Assembly Bill 1868). Therefore, in the event of a crude oil spill, cleanup efforts are required to ensure that oil is contained and does not remain in the environment.

In the unlikely event that a spill does occur and migrate to the beach before containment, the most likely health impact would be symptoms such as headaches and/or nausea from the odiferous compounds of crude oil. Acute eye/skin irritation, respiratory conditions, anxiety, and depression could also occur in people exposed to a crude oil spill; however, chronic health consequences are not expected to result from a short-term exposure to oil. Additionally, an oil spill may result in a fish and seafood advisory because the Santa Monica Bay is an important site for recreational diving and fishing. Community members who fish are advised to always pay attention and follow local fish advisories. Even if a spill never occurs, psychological stress related to the fear of a catastrophic spill is also a potential health impact from the proposed Project. The EIR provides mitigation measures that would minimize the risk and extent of an offsite crude oil spill. The mitigation measures that relate to offsite spill mitigation include:

- An Independent third-party audit should be completed and updated annually to ensure compliance of the gas and crude oil pipelines with Fire Code, and other applicable codes and emergency response plans requirements;
- All crude-oil truck haulers and a sufficient number of onsite personnel (at least two per shift) should be trained in HAZMAT spill response and each truck should carry a spill response kit;
- The installation of back-flow prevent devices would ensure that a rupture of the pipeline along Valley Drive would produce a release with a short duration; and,
- Warning tape should be installed above the pipelines within the pipeline trench to warn third parties that pipelines are located below the tape.

The impact of a Project-related oil spill on the health of the community is provided in Table 5-18.

Table 5-18 Upset Scenario: Crude Oil Spill

Health Determinant	Crude oil spill
Potential Health Outcome	Acute health symptoms and psychological effects including stress
Pre-Mitigation Discussion	Without mitigation, extent of a potential spill could be greater and more likely to result in a negative health impact. Although highly unlikely, the possibility of a spill occurring is not possible to mitigate completely.
EIR Mitigation	An independent third party audit of equipment and additional upset scenario risk reduction measures (SR-1a through SR-1g)
Geographic Extent	Localized
Vulnerable Populations	People in immediate vicinity
Magnitude	Medium
Adaptability	Medium
Likelihood	Unlikely
Post-Mitigation Health Effect	No substantial effect
Comments or Additional Recommended Measures	Incorporate oil spill scenario into the City of Hermosa public preparedness awareness program

While mitigation measures reduce the risk and extent of an oil spill, it is not possible to completely eliminate the possibility of an offsite oil spill occurring. In the event an offsite oil spill, health impacts would be limited to a '**localized'** group of individuals in contact with the spill area. The vulnerable population is identified as '**people in the immediate vicinity**' of spilled oil. The magnitude is classified as '**medium**' because an oil spill that reaches the beach/ocean could result in acute health outcomes that are detectable, reversible, and pose a minor hazard to health. The adaptability is classified as '**medium**' because people suffering psychological stress because of concern that a spill could occur or psychological impacts after a crude oil spill may require support. The likelihood was defined as '**unlikely**' since an oil spill into the ocean is a very low probability event (0.07%). Overall, the HIA predicts '**no substantial effect'** but in the unlikely event that a spill was to occur it could negatively affect local or community health. To that end, it is recommended that the City of Hermosa incorporate the possibility of an oil spill into their current public preparedness awareness program. While the facility is required by regulation to have emergency response plans in place, the preparation of an up-to-date emergency preparedness plan for the community is the duty of the City of Hermosa Beach Emergency Preparedness Advisory Board.

5.4.2 Well Blowout

5.4.2.1 Well Blowout and Health

As described in the EIR, well blowouts occur when drilling encounters an area of pressure that exceeds the capacity of the drilling muds, and oil and gas flow back up the well to the surface (MRS, 2014). The release of flammable material could, if it encounters an ignition source, either explode or burn. People located nearby during such an event could suffer serious health consequences. For example, direct health impacts can include fatalities and injuries that would require hospitalization, as well as neurological conditions linked to acute exposure. Injury from a well blowout could range in severity and type, including burns from contact with fire or physical injury due to getting struck by equipment parts that come loose and hit someone because of high pressures. In most documented instances of well blowouts, such as the Deepwater Horizon blowout explosion, workers face the greatest risk of death or injury as they are the closest in proximity to the situation.

Additionally, as in the case of an oil spill, potential indirect health impacts of a well blowout may include elevated levels of anxiety and depression, resulting from either the perceived risk or from an actual upset event. As discussed in Section 3.1, the fear of an accidental explosion was the concern ranked highest among the community. This indicates psychological stress related to the fear of a fatal explosion is also a potential health impact from the proposed Project.

5.4.2.2 Current Conditions

Currently, there are no oil and gas operations in the City of Hermosa or in the immediate vicinity. The storage and use of propane at the maintenance yard introduces some small risk of fire to the onsite area under current conditions.

5.4.2.3 Project Impact

Information from the EIR (Section 4.8) was reviewed to identify the probability and extent of a well blowout related to Proposed Project activities. That information, as summarized below, was considered in order to evaluate the potential human health impacts of an upset event.

A well blowout accident, and the associated consequences such as fire and vapor clouds, could potentially result in severe impacts to human health due to fatalities and/or injuries. The fear of a blowout accident could result in moderate impacts to human health due to elevated levels of distress over the possibility that a blowout could occur. As described in Section 4.8.4.4 of the EIR, there is considerable uncertainty regarding whether pressure will be encountered in the wells during drilling. It is possible that the oil reservoir is not pressurized, in which case a blowout could not occur. If substantial pressures are encountered, then a pressurized release, or blowout, could occur during drilling and soon after the well has been drilled. The risk of fatality and/or injuries from a well blowout accident depends on a number of factors including the volume of flammable materials, duration of release, meteorological conditions, and how many people are exposed.

A frequency analysis conducted for the EIR estimated the rate of upset events during the proposed Project. Assuming the reservoir is pressurized and blowouts could occur, the failure rate for a wellhead rupture during drilling is one failure per 323 years. The failure rate for a wellhead rupture during production is only one failure per 604,127 years (Table 4.8-12; MRS, 2014). In the unlikely event of a blowout, the EIR consequence analysis estimated that offsite fatalities and injuries could occur as far away as 300 and 750 feet, respectively, from the Project Site (Figure 4.8-5; MRS, 2014). Because the proposed Project Site is located within 100 feet of businesses and 160 feet of residences, a well-blow out incident could result in fatalities and/or injuries among the public. Considering together the frequency and consequence analyses, the resulting risks exceed the EIR threshold for significance. Because the blowout scenario cannot be mitigated to a level of insignificance, the EIR concludes that blowout risks during drilling remain ‘significant and unavoidable’ (MRS, 2014).

The impact of a Project-related well blowout scenario on the health of the community is provided in Table 5-19.

The EIR identifies mitigation measures which would reduce the risk of generating serious injuries or fatalities to members of the public in the event of a well blowout. The Applicant’s proposed project features and measures required by the Conditional Use Permit would also reduce these risks. While mitigation measures reduce the risk of a well blowout resulting in injuries or fatalities, it is not possible to completely eliminate the possibility that a catastrophic event could occur or eliminate distress over the fear of a blowout occurring.

Table 5-19 Upset Scenario – Well Blowout

Health Determinant	Well blowout
Potential Health Outcome	Injuries and/or fatalities and psychological effects including stress
Pre-Mitigation Discussion	Risk of well blowout during drilling is not possible to mitigate completely, evaluation is the same with and without mitigation
EIR Mitigation	An independent third party audit of equipment and additional upset scenario risk reduction measures (SR-1a through SR-1g)
Geographic Extent	Localized
Vulnerable Populations	People in immediate vicinity (est. maximum of 750 feet from the Site)[1]
Magnitude	High
Adaptability	Low
Likelihood	Unlikely
Post-Mitigation Health Effect	Negative
Comments or Additional Recommended Measures	Incorporate well blowout scenario into the City of Hermosa public preparedness awareness program

[1]Figures 4.8-5 and 4.8-6 of Final EIR provide estimated range and map, respectively (MRS, 2014)

In the event of a well blowout, health impacts would be limited to a '**localized'** group of individuals. For example, an explosion from a well blowout and the associated fragment, vapor cloud, or fire impacts could extend to a maximum of about 750 feet from the Project Site. The vulnerable population is identified as '**people in the immediate vicinity**' of a well blowout. The magnitude is classified as '**high**' because a well blowout could result in serious injuries and/or fatalities. The adaptability is classified as '**low**' because people suffering from injuries or psychological impacts after a catastrophic scenario may not be able to adapt or maintain pre-project level of health. The likelihood was defined as '**unlikely**' since a well blowout is a very low probability event (once in 323 years during drilling and once in 604,127 years during non-drilling periods– if at all). Overall, the HIA predicts '**negative"** effect, because there is no question that in the unlikely event that an upset or accident was to occur it could negatively and severely affect local or community health. To that end, it is recommended that the City of Hermosa incorporate the possibility of a well blowout into their current public preparedness awareness program. While the facility is required by regulation to have emergency response plans in place, the preparation of an up-to-date emergency preparedness plan for the community is the duty of the City of Hermosa Beach Emergency Preparedness Advisory Board.

5.4.3 Summary and Conclusions for Spill or Blowout Upsets

This HIA evaluated the health impacts of two upset scenarios, an offsite oil spill and a well blowout. Potential human health impacts of exposure to an offsite oil spill include headaches, eye/skin irritation, respiratory conditions, anxiety, and depression. In the unlikely event of a spill (0.07% chance of an oil spill to the ocean), the Applicant would be required to contain and clean-up any crude oil in the environment, thus irreversible or chronic health outcomes would not be expected to occur and the HIA concludes 'no substantial effect' related to the oil spill health determinant.

A well blowout could result in serious injuries and/or fatalities among community members in the vicinity of the proposed Project Site. A well blowout is a very low probability event, predicted to occur once in 323 years during drilling and once in 604,127 years during non-drilling periods if the wells are pressurized. The fear of a blowout accident could result in moderate impacts to human health due to elevated levels of distress over the possibility that a blowout could occur. Because a well blowout could have severe health consequences and the possibility of an upset scenario occurring cannot be completely avoided through mitigation, the blowout assessment concludes a 'negative' health effect. In addition to emergency response plans prepared by the Applicant, the City should consider incorporating the possibility of an oil spill or well blowout into their current public preparedness awareness program.

In the oil spill assessment concludes there is no substantial effect with implementation of the proposed EIR mitigation measures. The blowout assessment within the HIA concludes that there is a low probability of occurrence, but in the event such upset scenarios were to occur, they could have significant negative health implications. The HIA also found a negative health effect of stress due to fear of a blowout accident. The HIA recommends that the City incorporate the possibility of an oil spill or well blowout into its current emergency preparedness plan.

5.5 Noise and Light

This section assesses the potential for noise and light emissions to have an impact on human health from various Phases of the proposed Project. Although both noise and light are useful components of everyday life, they are highly subjective emissions that can be perceived differently by different individuals. For example, sounds that are considered pleasant or tolerable to one person may be perceived as annoying or unwanted to another. Additionally, keeping the lights on at night may prove useful or necessary to one person and be considered ineffective or unacceptable to another. This poses a unique challenge when assessing these variables. For this reason, objective health-based evidence has been used to evaluate potential impacts of noise and light emissions on the surrounding community.

5.5.1 Noise Emissions

5.5.1.1 Noise and Health

Noise is typically used to describe any sound that is unwanted. The definition of an unwanted sound is subjective since there is a high degree of variability among individual sound preferences with different individuals having different perceptions and attitudes towards different types of noise (WHO, 2009). This is often based on a combination of factors including personal preferences, sensitivities, and attitudes, which can vary depending on the individual, group or community (Pierrette et al., 2012). In Hermosa, the Community Dialogue quality of life committee identified two types of sounds that are heard frequently in the neighborhood and do not cause annoyance: wind chimes and foghorns. Not coincidentally, these two sounds are representative of the beach lifestyle and local residents have become accustomed to these specific noises. This is an example of how attitudes and adaptability can influence noise tolerance more than the underlying auditory physiology.

One of the major effects of exposure to environmental noise is annoyance. Noise-related annoyance, typically described as a feeling of displeasure evoked by a noise, has been extensively linked to a variety of common noise sources such as rail, road, and air traffic (Berglund and Lindvall, 1995; Laszlo et al., 2012; WHO Europe, 2011). Although annoyance is considered to be the least severe potential impact of community noise exposure (Babisch, 2002; WHO Europe, 2011), it has been hypothesized that sufficiently high levels of noise-related annoyance could lead to negative emotional responses (e.g., anger, disappointment, depression, or anxiety) and psychosocial symptoms (e.g., tiredness, stomach discomfort and stress) (Fields et al., 2001; 1997; Job, 1993; WHO Europe, 2011; Öhrström, 2004; Öhrström et al., 2006). Therefore, regulations exist in many jurisdictions around the world to limit community noise exposure from stationary sources (e.g., factories) as well as road, rail, and air traffic in order to curtail community levels of annoyance and more severe impacts of community noise exposure. It is important to emphasize that the existence of these guidelines has not eliminated community noise annoyance and noise related annoyance remains prevalent in many areas.

Noise has become a ubiquitous part of modern society, with many people living in urban areas that are infiltrated with some type of noise 24 hours per day (Lekaviciute and Sobotova, 2013). To address the widespread issue of noise, especially at night, governments and health agencies have put noise limits in place to protect public health. The World Health Organization (WHO, 2009) has published a document entitled "*Night Noise Guidelines for Europe"* that identifies the potential health impacts of exposure to different levels of nighttime noise (Figure 5-1).

Children are especially vulnerable to the harmful effects of noise. This is particularly true in learning environments as children's ability to recognize speech under unfavorable noise conditions is still developing through the teenage years. Short-term exposure to loud noise can affect children's short-term memory, reading, and writing ability. Long-term exposure to lower levels of noise can affect cognitive performance of children including attention span, concentration and memory, and discrimination between sounds (Klatte, 2013).

The document evaluates the scientific and epidemiologic data around potential effects of nighttime noise. A small number of factors were found to have sufficient evidence of biological effects and changes in sleep quality with specific sound levels. For example, at a sound pressure level of 35 decibels (dB) changes in duration of various stages of sleep, in sleep structure and fragmentation of sleep begin to occur. At sound levels of 42 dB, increased movement while asleep and self-reported sleep disturbance begin to occur. There is also some evidence of increased risk of hypertension when nighttime noise levels reach 50 dB (WHO, 2009). Based on the weight of evidence, WHO identifies an interim night noise guideline of 55 dB, acknowledging that in many areas (especially urban/commercial/industrial) lower limits are not feasible. As an ideal target nighttime noise guideline the WHO recommends 40 dB. Stating that: "the LOAEL [lowest observed adverse effect level] of night noise, 40 dB Lnight, outside, can be considered a health-based limit value of the night noise guidelines necessary to protect the public, including most of the vulnerable groups such as children, the chronically ill and the elderly, from the adverse health effects of night noise" (WHO, 2009).

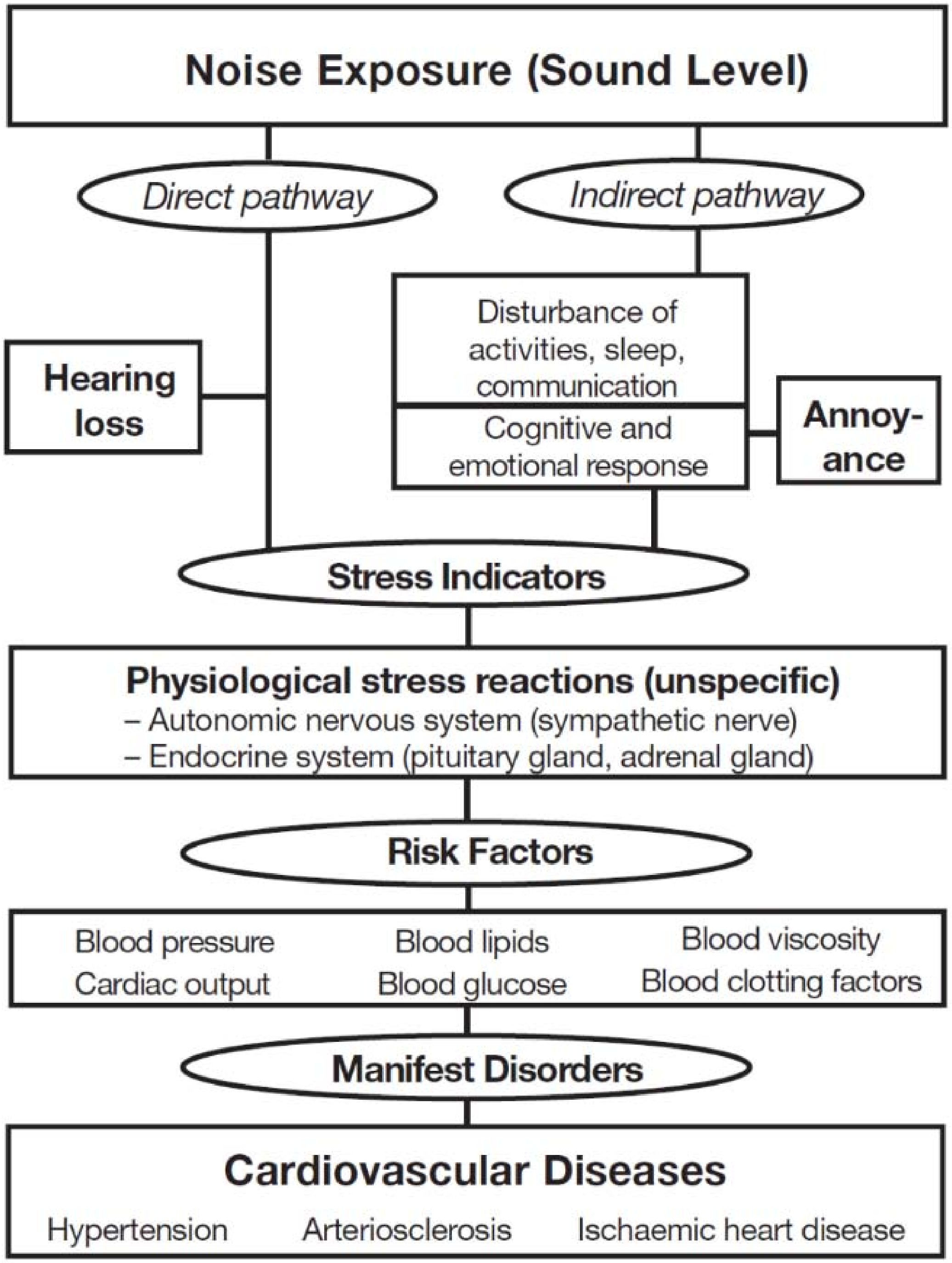

Figure 5-1 Possible health implication of exposure to noise (WHO, 2009)

The Centers for Disease Control and Prevention (CDC, 2013) has also set recommended exposure levels for noise based on sensitive receptors (i.e., youth). The exposure levels are classified as safe, potentially hazardous and hazardous. The typical exposures identified as ‘safe’ included typical library setting (40 dB for any duration), and normal conversational speech (60 dB for any duration) and the sound of an electric pencil sharpener (71 dB for any duration). Exposures identified as ‘potentially hazardous’ included a school cafeteria (85 dB for 8 hours) and use of power tools (100 dB for 15 minutes). Finally, hazardous noise exposures included a loud rock concert (110 dB for 1.5 minutes) and firecrackers or firearms (140-165 dB – immediate hearing damage possible).

Overall, exposure to noise is partly based on objective components such as high sound pressure levels (150 dB) having the ability to cause hearing loss, and subjective aspects related to noise perception, annoyance and stress. Another important consideration when evaluating potential impacts of noise is the timing and duration of exposure. Nighttime noise has been found to be more annoying than the same sound pressure levels during the day (WHO, 2009). Furthermore, the duration of exposure is an important consideration since higher levels of noise can be tolerated for shorter time periods than lower noise levels (CDC, 2013). In order to effectively evaluate potential impacts of noise emissions on health, the specific noise source and exposure scenario must be critically evaluated.

5.5.1.2 Current Conditions

The existing noise conditions in the area around the proposed Project Site and along the pipeline and truck routes were determined as part of the EIR. Noise monitoring was conducted using unmanned data acquisition systems to continuously measure and log noise levels. The specific locations selected for monitoring included areas in proximity to future potential noise impacts from the proposed Project and areas with sensitive land uses (MRS, 2014).

According to the EIR, in order to capture the most relevant data and get an accurate noise baseline for evaluation, monitoring was carried out on both weekdays (Monday-Friday) and weekends (Saturday-Sunday) at six locations in the vicinity of the Project Site (6th St. and Cypress, 634 Loma St., 730 Cypress St., 526 8th St., 600 6th St., Veterans Parkway). The noise monitoring occurred on a continuous basis during August and September 2013, with a break in measurements over the Labor Day holiday weekend to avoid gathering non-representative data. The locations selected for long-term noise monitoring around the Project Site are shown in Figure 5-2. The results of the noise monitoring include both daytime (8 am to 7 pm) and nighttime (7 pm to 8 am). The equivalent sound level (Leq) is the average noise level over the period of time, reported in dBA that approximates human sensitivity to sound. Both the lowest hourly Leq and the overall average Leq are provided for each of the selected locations (Table 5-20).

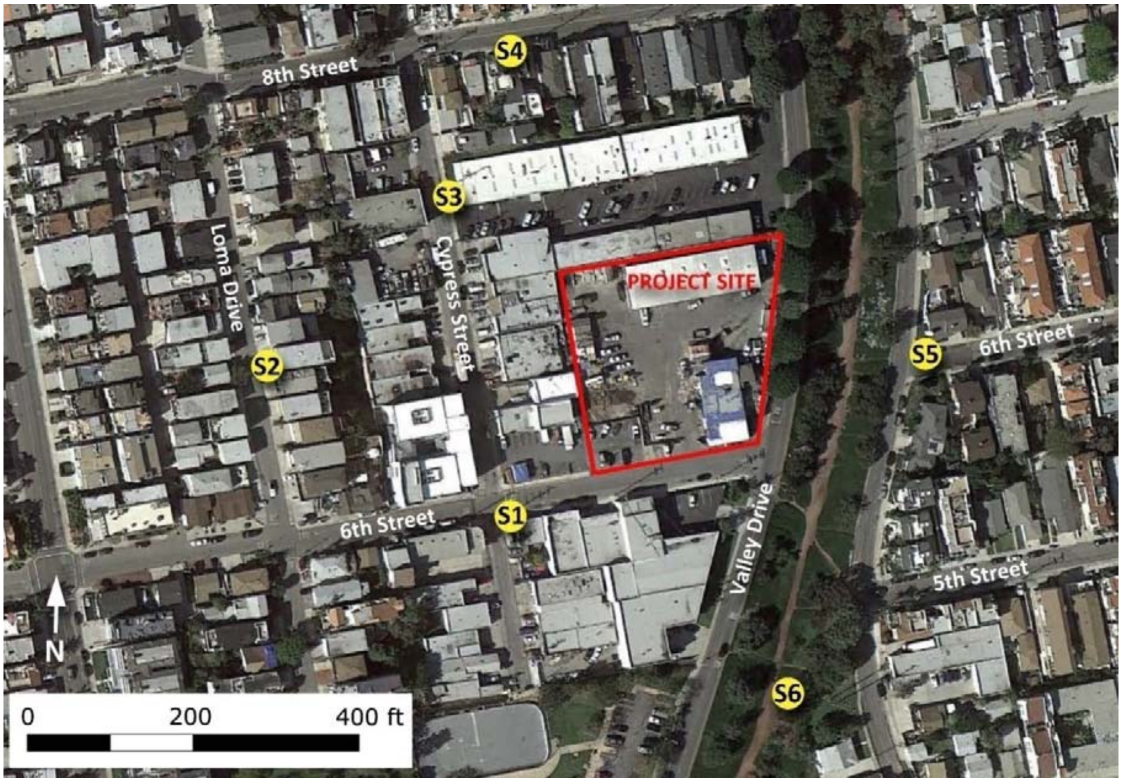

Figure 5-2 Noise Monitoring Locations around the Proposed Project Site (MRS, 2014)

Table 5-20 Summary of Existing Ambient Leq Noise around the Proposed Project Site (MRS, 2014)

Monitoring Location		Monday - Friday				Saturday & Sunday			
		Lowest Hourly L_{eq} (dBA)		Overall Average L_{eq} (dBA)		Lowest Hourly L_{eq} (dBA)		Overall Average L_{eq} (dBA)	
		Daytime 8am-7pm	Nighttime 7pm-8am	Daytime 8am-7pm	Nighttime 7pm-8am	Daytime 8am-7pm	Nighttime 7pm-8am	Daytime 8am-7pm	Nighttime 7pm-8am
S1	6th Street & Cypress	55.7	38.1	61.2	53.0	53.1	37.7	58.0	52.2
S2	634 Loma Dr.	49.7	40.0	55.8	48.8	47.6	39.9	51.5	47.0
S3	730 Cypress St.	50.4	38.0	58.9	48.5	47.5	37.6	53.0	48.0
S4	526 8th Street	61.7	45.6	63.6	58.5	60.3	48.3	63.3	58.3
S5	600 6th Street	57.3	38.3	60.6	54.2	52.7	42.4	57.6	50.8
S6	Veterans Parkway	51.3	35.6	56.4	47.8	50.2	40.7	52.1	46.5

Extensive noise monitoring was also conducted along the truck and pipeline routes during August 2012. The data from the 2012 study has been used as the baseline for the noise impact analysis for the truck and pipeline routes in the EIR (Table 5-21).

Table 5-21 Truck and Pipeline Route Ambient Noise Measurement Summary (MRS, 2014)

Behrens Location Number	Address	City	Daytime (7am - 10pm) Leq (dBA)	CNEL (dBA)	20-minute Daytime Leq (dBA)
T1	6th Street & Cypress Street	Hermosa Beach	59.9	61.4	-
T2	531 Herondo Street	Redondo Beach	66.5	68.7	-
T3	426 Anita Street	Redondo Beach	73.2	75.5	-
T4	1107 Valley Drive	Hermosa Beach	63.4	65.1	-
T5	201 Valley Drive	Hermosa Beach	63.5	64.0	-
T6	1556 Prospect Avenue	Hermosa Beach	63.3	63.7	-
T7	404 Gentry Street	Hermosa Beach	64.4	65.1	-
T8	752 Pier Avenue	Hermosa Beach	73.1	75.8	-
T9	1213 Owosso Avenue	Hermosa Beach	63.4	66.2	-
T10	1228 Agate Street	Redondo Beach	57.7	60.1	-
T11	5410 W. 190th Street	Torrance	70.6	73.3	-
T12	4777 W. 191st Street	Torrance	64.9	67.2	-
T13	4713 Towers Street	Torrance	69.7	73.4	-
T14	4305 W. 190th Street	Torrance	73.0	75.6	-
T15	4100 W. 185th Street	Torrance	69.6	70.7	-
T16	3625 W. 190th Street	Torrance	75.3	77.6	-
T17	18721 Crenshaw Blvd	Torrance	69.7	73.4	-
T18	415 Herondo Street	Hermosa Beach	-	-	57.3
T19	2 Hermosa Avenue	Hermosa Beach	-	-	65.7
T20	1231 N. Catalina Avenue	Redondo Beach	-	-	64.9
T21	408 Agate Street	Redondo Beach	-	-	61.9
T22	817 N. Lucia Street	Redondo Beach	-	-	54.0
T23	817 N. Paulina Avenue	Redondo Beach	-	-	54.9
T24	801 Anita Street	Redondo Beach	-	-	58.4
T25	1327 Amethyst Street	Redondo Beach	-	-	61.5
T26	5210 Arvada Street	Torrance	-	-	51.9

Since Hermosa Beach is a City that includes residential, commercial and light-industrial land uses, and has a considerable amount of traffic, it is not surprising that their baseline noise levels fluctuate between around 40 dBA (L_{50}) and approximately 70 dBA (Leq) depending on the time of day and day of the week (MRS, 2014). This suggests that Hermosa residents living in these areas are already accustomed to experiencing noise levels that are consistent with suburban/urban and commercial areas. Typical noise levels in an urban outdoor environment are approximately 65 dBA during the day and approximately 45 dBA during the night (MRS, 2014). Daytime Leq levels are within typical noise levels for outdoor urban environments; however, nighttime Leq levels are slightly higher. Near the Project Site, the monitoring location on 526 8th Street has the highest noise measurements for daytime or nighttime.

Baseline ambient monitoring data was also available for locations in proximity to several local schools that are located in the vicinity of the proposed Project Site, proposed Maintenance Yard or pipeline route. The ambient daytime noise levels (Leq) were monitored near the following schools:

- Our Lady of Guadalupe (Valley Drive – Hermosa Beach): 64.4 dBA;
- Our Lady of Guadalupe (Anita Street – Hermosa Beach): 64.4 dBA;
- Hermosa Valley School (Valley Drive – Hermosa Beach): 63.4 dBA;
- Hermosa View Elementary (Valley Drive – Hermosa Beach): 63.3 dBA;
- Towers Elementary (190th Street – Torrance): 61.5 dBA; and,
- Magruder Middle School (190th Street – Torrance): 69.6 dBA.

Additionally, the locations monitored in the vicinity of the pipeline and truck routes and had daytime noise levels ranging from approximately 57 to 77 dBA. Although the typical noise level for daytime urban areas is around 65 dBA, it is possible that the presence of traffic may elevate the average noise levels above this. For example, the noise associated with a large truck passing by (50 feet away) can produce noise levels of 85 dBA (Figure 5-3).

Outdoor Environment	Noise Level (dBA)	Indoor Environment
	120	
Jet fly-over at 1,000 feet		
	110	Rock concert
Pile driver at 100 feet	100	
		Night club with live music
	90	
Large truck passby at 50 feet		
	80	Noisy restaurant
Gas lawn mower at 50 feet		
	70	Vacuum cleaner at 10 feet
Commercial/Urban area daytime		Normal speech at 5 feet
	60	
Suburban daytime		Active office environment
	50	
Urban area nighttime		Quiet office environment
	40	
Suburban nighttime		Library
Quiet rural areas	30	Quiet bedroom at night
Wilderness area	20	
		Quiet recording studio
	10	
Threshold of human hearing	0	Threshold of human hearing

Figure 5-3 Common Environmental Noise Levels (MRS, 2014)

5.5.1.3 Project Impact

According to the EIR, there are potential noise impacts from the proposed Project, including the development and ongoing operation of the oil drilling and production facility, the truck routes and construction of oil and gas pipelines that would extend out from Hermosa Beach into the cities of Redondo Beach and Torrance and the relocation of the City Yard (MRS, 2014).

Noise Guidelines:

The EIR stated that there are no quantitative noise standards in the City of Hermosa Beach Municipal Code; however, the Code does include certain qualitative noise regulations and restrictions on the allowable timing of noisy activity that are generally applicable to the Project (MRS, 2014):

> *No person shall make, permit to be made or cause to suffer any noises, sounds or vibrations that are so loud, prolonged and harsh as to be physically annoying to reasonable persons of ordinary sensitivity and to cause or contribute to the unreasonable discomfort of any persons within the vicinity. When considering whether a noise, sound or vibration is unreasonable, the following factors shall be taken into consideration:*
>
> - *The volume and intensity of the noise;*
> - *Whether the noise is prolonged and continuous;*
> - *How the noise contrasts with the ambient noise level;*
> - *The proximity of the noise source to residential and commercial uses;*
> - *The time of day; and*
> - *The anticipated duration of the noise.*

There are restrictions around the hours that construction activities are allowed to take place. All construction activities must be conducted between the hours of 8:00 am and 6:00 pm, Monday through Friday (except national holidays), and between 9:00 am and 5:00 pm on Saturday, and are prohibited at all other hours and on Sunday and national holidays. Construction activities include site preparation, demolition, grading, excavation, and the erection, improvement, remodeling or repair of structures, including operation of equipment or machinery and the delivery of materials associated with those activities (MRS, 2014).

Regarding noise from drilling or re-drilling activities associated with the proposed Project, there are specific exterior noise level standards as per the Hermosa Beach Municipal Code (Oil Code) (Table 5-22). Additionally, per the Oil Code, the only activity permitted between the hours of 7:00 pm and 8:00 am is 'on-bottom' drilling, with single joint connections.

Table 5-22 Daytime and Nighttime Noise Level Standards (MRS, 2014)

Cumulative Number of Minutes In Any One-Hour Time Period	Noise Level Standards, dBA	
	Daytime (8 am to 7 pm)	Nighttime (7 pm to 8 am)
30	50	45
15	55	50
5	60	55
1	65	60
0	70	65

For the purpose of the EIR, Project noise levels contributing a 3 to 5 dBA increase over the baseline noise level were selected as significance criteria. These levels are derived from typical human response to changes in noise level. As per the EIR, a change of 3 dBA is generally acknowledged as the point at which most people would begin to perceive an increase or decrease in noise level; a change of 5 dBA is considered to be the point at which most people would perceive a significant increase or decrease in noise level. The lower value was selected for residential locations with nighttime occupancy (nighttime usually produces the lowest hourly, A-weighted equivalent noise level), whereas the higher value was used for areas that generally do not have nighttime occupancy (MRS, 2014).

Since industry-related noise can often impact sensitive receptors, many mitigation methods are available to reduce noise, including: walls, temporary and permanent acoustical barriers, engine exhaust silencers, acoustical equipment enclosures, sound-absorbing blankets and panels, and sound-dampening flooring and siding materials (MRS, 2014). Without mitigation, the project would pose unacceptable health risk to residents due to high levels of noise occurring over a prolonged period of time. The EIR mitigation measures proposed for each Phase of the Project and their impact on noise emissions is discussed below.

Phase 1:

According to the EIR, the noisiest portion of the demolition stage is expected to be the removal of concrete paving, fencing and walls, estimated to last up to 7 weeks. By a similar assessment, the noisiest part of the construction work in Phase 1 has been determined to be the pumping of concrete for the new well cellar; the noisiest stage of this construction work would occur when a concrete truck and concrete pump are in use simultaneously, estimated to last up to 2 weeks. Based on modelling of these two worst-case scenarios, additional measures (beyond the typical noise-reduction design features) to mitigate noise emissions were necessary (MRS, 2014). The mitigation measures generally include (NV-1a to NV-1c):

- Increasing the height of the noise barrier on all sides of the Site to 24-feet (24-feet is the maximum feasible height for a noise barrier during Phase 1);
- Increasing the height of the gates on the east and south sides of the site (24-feet); and,
- All acoustical barriers around the site will be subject to specific sound absorption performance standards.

According to the EIR, the noise modelling results show that even with implementation of these additional mitigation measures, there is a 'significant' increase in local noise. The change in local daytime noise from the demolition activities is expected to result in an increase of 2.5 dBA to 10.3 dBA, and an increase of 1.3 dBA to 9.2 dBA from construction activities. The highest overall noise levels that would occur as a result of demolition (66 dBA) and construction (65 dBA) are both well within normal daytime noise level for urban and commercial areas (MRS, 2014; Figure 5-3). It is important to note that noise levels decrease with distance and based on the noise contour drawings provided in the EIR report (MRS, 2014), the noise decreases rapidly as you move away from the Project Site. It is not anticipated that the construction activities from the proposed Project will differ in any way from other construction Projects that regularly occur in urban and suburban areas (Golmohammadi et al., 2013). Although it is likely that a subset of the local population will be highly annoyed by the noise, it is relatively short-term in nature and will only occur during the day.

Phase 2:

Phase 2 of the proposed Project is estimated to take 12 months. According to the EIR, the test drilling and test production activities would occur simultaneously for approximately two months. During this time, drilling and test production equipment would operate 24-hours per day. After the overlap period, the test production activity only would continue for approximately seven months, with equipment operating continuously 24-hours per day. The drilling would occur for four months. Based on modelling of the worst-case noise scenarios, additional measures (beyond the typical noise-reduction design features) to mitigate noise emissions were necessary (MRS, 2014). The mitigation measures generally include (NV-2a to NV-2j; NV-3a to NV-3d):

- Increasing the height of the noise barrier to 35 feet (maximum height allowed by zoning);
- All acoustical barriers around the site will be subject to specific sound absorption performance standards.
- Installation of 'pads' in various locations to reduce metal-on-metal noise;
- Provision of additional acoustical enclosures, acoustical shrouds, silencers;
- Implement a "Super-Quiet Mode" of operation between the hours of 2AM and 5AM, during which time drilling would essentially be suspended to minimize noise; and,
- Provide acoustical treatment within the combustor fan housing and/or at the ventilation openings, as necessary to limit the total sound power level to 86 dBA.

According to the EIR, implementation of the additional mitigation measures results in an increase in noise that is not significant (<3 dBA). Additionally, the predicted drilling and test production noise levels are below the limit of 45 dBA as per the Hermosa Beach Oil Code (MRS, 2014). Given that the World Health Organization Nighttime Noise Interim Target is 55 dBA, the standard set by Hermosa Beach (45 dBA) is considered a sufficient nighttime noise target (WHO, 2009). At these levels, there is the potential for sensitive individuals to experience sleep disturbance and a subset of the population may become annoyed. However, any impact on sleep quality is expected to be minimal since the background nighttime levels of noise (46.5 to 58.6 dBA, Leq) measured in the vicinity of the proposed Project Site are already above 45 dBA and to our knowledge, this is not currently an issue for Hermosa residents.

Phase 3:

Site Construction

Construction activities at the Project Site during Phase 3 are scheduled to last for 14 months. According to the EIR, the noisiest portion of the work is expected to occur during an eight-week period when the construction of five steel tanks and installation of mechanical and electrical equipment occurs simultaneously. This part of the site construction was modeled as representing the worst-case noise scenario.

For the site construction in Phase 3, the same noise reduction measures as Phase 1 are proposed. In addition, a 16-foot high permanent masonry wall is proposed around the perimeter of the Site, with a temporary 16-foot high barrier wall in-place to ensure that no site construction work is carried out in Phase 3 without a perimeter noise barrier being in place. Further, temporary portable noise barriers (minimum of 8-feet high) will be positioned around the concrete truck engine, welders and crane engine when these items are in use (MRS, 2014). Based on modelling of the worst-case noise scenarios, additional measures (beyond the typical noise-reduction design features) to mitigate noise emissions were necessary (MRS, 2014). The mitigation measures generally include (NV-4a to NV-4c):

- Increasing the height of the noise barrier on all sides of the site to 24-feet;
- Increasing the height of the gates on the east and south sides of the site (25-feet); and,
- All acoustical barriers around the site will be subject to specific sound absorption performance standards.

According to the EIR, the noise modelling results show that even with implementation of these additional mitigation measures, there is a 'significant' increase in local noise. The change in local daytime noise from site construction activities is expected to result in an increase of 2.2 dBA to 11.9 dBA. The highest overall noise level that would occur as a result of construction (66.5 dBA) is within normal daytime noise level for urban and commercial areas and would decrease with increasing distance from the Site (MRS, 2014). As with Phase 1, it is not anticipated that the construction activities from the proposed Project will differ in any way from other construction Projects that regularly occur in urban and suburban areas (Golmohammadi et al., 2013). Although it is likely that a subset of the local population will be highly annoyed by the noise, it is relatively short-term in nature and will only occur during the day.

Pipeline Construction:

During this stage of Phase 3, new Pipelines would be constructed to move produced oil and gas offsite. The pipelines would pass through the cities of Hermosa Beach, Redondo Beach and Torrance. According to the EIR, construction of the Pipelines is scheduled to take 17 weeks, with the time in front of any one location limited to approximately 1 week (MRS, 2014). The Hermosa Beach portion of the pipeline construction would extend south from the Project Site along Valley Drive to Herondo Street. The section of the Valley Drive work expected to cause the most noise impact would occur between South Park and 2nd Street, which has been selected as the worst-case scenario for noise modelling in the EIR. In order to reduce the potential noise emissions from pipeline construction, the following design features were proposed (MRS, 2014):

- Temporary noise reduction barriers, minimum 12-feet high, located on either side of the pavers and trenchers in such a way as the block the line-of-sight between the equipment and the nearest sensitive receiver. The barriers will be moved alongside the equipment as the work progresses; and
- Pipeline construction will be limited to daylight hours between 8:00am and 3:00pm, Monday through Friday in the City of Hermosa Beach and 9:00am to 3:00pm Monday through Friday in the cities of Redondo Beach and Torrance. There will be no pipeline construction work on Saturdays, Sundays or holidays.

Although these design features will reduce the amount of noise emitted from pipeline construction activities, they cannot reduce the noise below a level that will constitute a 'significant' increase that will be noticed by residents. Based on the results of the noise modelling, the EIR stated:

> *"Due to the nature of the work, further options for mitigation of pipeline construction noise (beyond the measures already proposed by the Applicant and included in the noise model) are expected to be very limited - and it would therefore not be possible in practice to reduce noise impact on nearby sensitive receivers to less than significant levels at any portion of the Pipeline route" (MRS, 2014).*

The noise emissions associated with pipeline construction are anticipated to produce a noticeable increase in local outdoor noise. The noise in the immediate vicinity of the pipeline construction will be from 18.8 dBA to 31.2 dBA above existing background levels. The average daytime noise (Leq) can be expected to reach 80.5 dBA to 89.6 dBA depending on the location. These levels are consistent with a noisy restaurant or a large truck (passing by at 50 ft), and have the potential to lead to negative health effects if experienced for prolonged periods of time.

Since pipeline construction is transient and the construction activities will only remain in any one area for approximately 1 week, the exposure is short-term in duration. Additionally, since the pipeline construction is limited to daytime hours and will only occur during the weekdays, when the majority of people are not in their homes, the potential for health impacts is drastically diminished.

The majority of scientific literature has focused on the potential for noise to disrupt sleep, which can lead to other health issues, rather than high level, short duration exposures to noise. Since all construction activities are restricted from 3:00 pm to 8:00 am, potential health issues associated with nighttime noise are not relevant. A study conducted by Golmohammadi et al. (2013) looked at community noise annoyance due to construction worksites. They examined noise levels around 20 construction sites and evaluated self-reported annoyance levels of nearby residents. The noise measurements collected at all 20 construction sites show that the sound pressure levels ranged from 60.2 dBA to 92 dBA (mean = 74.57 ± 7.12 dBA), which is within the range of noise levels (max = 89.6 dBA) anticipated for Phase 3 pipeline construction (Figure 5-4).

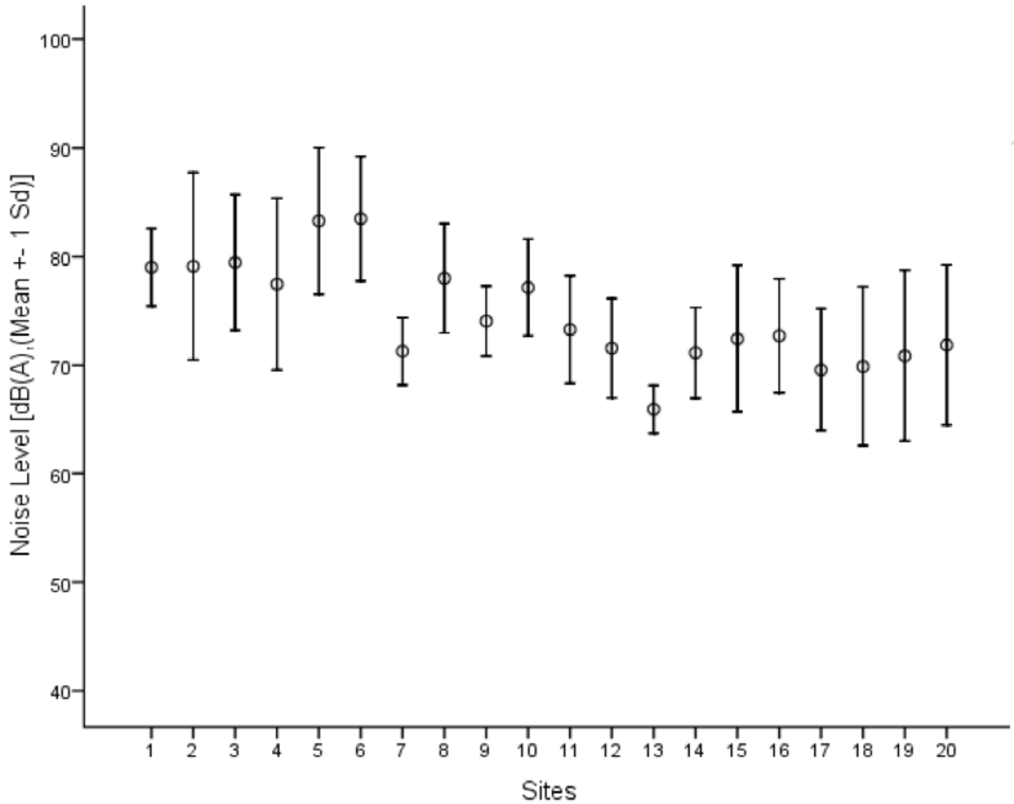

Figure 5-4 Noise Levels Measured at 20 Construction Sites (Mean ± SD) (Golmohammadi et al., 2013)

The study found that the majority of residents interviewed (note the study was not blinded) reported being annoyed by noise from nearby construction activities. The main complaints were sleep disturbance, disrupting concentration and relaxation, interfering with leisure activities (e.g., reading, watching television), and making communication more difficult. Sleep disturbance is not an issue for pipeline construction associated with the proposed Project since these activities are only permitted to occur during the day (8:00 am to 3:00 pm in Hermosa Beach and 9:00 am to 3:00 pm Redondo Beach and Torrance). Therefore, due to the short-term nature of the construction activities (1 week), time of day (8:00 am to 3:00 pm), and the fact that high levels of annoyance (and possibly stress) are the main issues, additional recommendations are not necessary. Therefore, to address the unavoidable increases in annoyance related to impacts on everyday tasks and leisure activities, it is recommended that written notification of the impending work be distributed to local residents. The notification should give all residents living in the vicinity of the pipeline construction activities fair warning that the activities are to occur at specific dates and times, and that higher than normal levels of noise may be experienced despite precautions to minimize noise emissions.

Phase 4:

Phase 4 includes drilling and production activities on the Site, which would overlap. In the EIR, the noise analysis assessed noise levels during drilling and production and during production only (no drilling). A total of 27 oil and gas wells and three water disposal/injection wells are proposed over a 30-month period, with drilling equipment operating 24-hours a day during this time. The drilling equipment that will be used is the same as that in Phase 2 and all of the Phase 2 noise reduction measures would also be applied in this phase, including the 32-foot high sound attenuation barrier. Once the drilling stage is complete, the 32-foot high noise barrier would be removed (leaving only the 16-foot high masonry wall constructed in Phase 3) and production activity would continue 24-hours a day for the remainder of the life of the Project. During re-drills, the 32-foot wall would be installed during the re-drill period (MRS, 2014).

According to the EIR, based on modelling of the worst-case noise scenarios associated with development, operations and long-term production in Phase 4, additional measures (beyond the typical noise-reduction design features) to mitigate noise emissions were necessary (MRS, 2014). The mitigation measures generally include (NV-6a to NV-6h; NV-7a to NV-7c):

- Increasing the height of the noise barrier to 35 feet (maximum height allowed by zoning);
- All acoustical barriers around the site will be subject to specific sound absorption performance standards.
- Installation of 'pads' in various locations to reduce metal-on-metal noise;
- Provision of additional acoustical enclosures, acoustical shrouds, silencers;
- Implement a "Super-Quiet Mode" of operation between the hours of 2AM and 5AM, during which time drilling would essentially be suspended to minimize noise;
- Provide enhanced inlet and outlet silencers for the Hydraulic Power Unit enclosure and upgrade the walls, roof and floor of the enclosure as necessary to limit the total sound power level radiated by the enclosure to 77 dBA;
- Increasing the height of the masonry walls on the north and west sides of the site to a minimum of 27-feet;
- Apply outdoor acoustical panels to all available surfaces of the north and west walls
- that face the production operations above a height of 10-feet above the ground; and
- Well workover rigs shall be powered by electric drive/sources or the use of "ultraquiet" generators or engines that are capable of operating below the noise significance thresholds for daytime operation.

According to the EIR, implementation of the additional mitigation measures results in acceptable noise levels (<3 dBA). The noise from production activities at the site are expected to result in increase of 0.2 to 2.8 dBA above existing background levels. With mitigation measures in place, the highest noise level is associated with long-term production activities but remains well below applicable noise thresholds (38.7 dBA), including for periodic re-drilling. Additionally, the predicted drilling and production noise levels are below the limit of 45 dBA as per the Hermosa Beach Oil Code (MRS, 2014).

Truck Traffic Noise:

Due to Project operations, it is expected that there will be an increase in truck traffic, which could lead to elevated traffic noise levels in the community. As discussed in the EIR, it is conventional to assess the noise impact of changes in traffic flow noise in terms of a 24-hour noise average such as Community Noise Equivalent Level (CNEL) or day-night equivalent noise level (Ldn). CNEL is marginally more stringent than Ldn, because it includes a 5 dB penalty for the evening hours (which Ldn does not) and was selected as the default metric for assessing traffic noise impact associated with the Project. A 3 dB increase in the CNEL was selected as the threshold of significance because it is generally acknowledged as the point at which most people would begin to perceive an increase or decrease in noise level (MRS, 2014).

The noise impact of additional traffic generated by the Project will be most pronounced on Valley Drive between Pier Avenue and 6th Street and between 6th and Herondo Streets. Traffic noise CNEL values for Valley Drive were calculated as part of the EIR at the closest residential properties to Valley Drive using a traffic noise model, and including present day and future traffic volumes with as well as the estimated additional trips associated with each of the four phases of the Project. The predicted increase in CNEL as a result if vehicle traffic on Valley Drive is modeled to range from 0 to 0.1 dBA, which is below the significance level of 3 dBA and would not produce a perceptible change to the human ear. Therefore, a potential increase in noise from truck traffic is not considered a health concern by the HIA Team.

Noise at Local Schools:

The proposed Project activities including Site development and operations, relocation of the maintenance yard and pipeline construction have the potential to produce noise emissions that could impact local schools. Therefore, noise modeling was conducted at several school sites in Hermosa Beach, Redondo Beach and Torrance (SRA, 2014) to evaluate the potential project-related noise contribution from the Site and maintenance yard relocation (Table 5-23) as well as the pipeline (Table 5-24).

Table 5-23 Predicted Daytime Noise (dBA) around Local Schools from Project Site and Maintenance Yard Relocation Activities (SRA, 2014)

Phase	Hermosa Valley School	Hermosa View Elementary	Our Lady of Guadalupe
PROJECT SITE			
Phase 1 Demolition	25.7	25.5	23.4
Phase 1 Construction	21.8	23.2	19.6
Phase 2 Drilling + Production	8.9	6.0	5.2
Phase 2 Test Production Only	7.1	2.2	1.4
Phase 3 Construction	27.2	24.9	24.8
Phase 4 Drilling + Production	7.1	5.8	5.9
Phase 4 Production Only	4.0	3.7	2.7
MAINTENANCE YARD RELOCATION			
Permanent Facility Demolition	29.1	24.2	17.6
Permanent Facility Construction	33.5	29.0	26.1
Permanent Facility Operation	12.5	9.0	0.0

Table 5-24 Predicted Daytime Noise around Local Schools from Pipeline Construction Activities (SRA, 2014)

Pipeline Segment	Closest Schools	City	Predicted Daytime Noise Levels (dBA)
Valley Drive	Our Lady of Guadalupe	Hermosa Beach	27.5
	Hermosa Valley School	Hermosa Beach	31.7
	Hermosa View Elementary	Hermosa Beach	32.8
	Jefferson Elementary	Redondo Beach	23.4
Anita Street	Our Lady of Guadalupe	Hermosa Beach	53.4
	Jefferson Elementary	Redondo Beach	53.4
	Beryl Heights Elementary	Redondo Beach	50.2
190th Street	Jefferson Elementary	Hermosa Beach	53.4
	Towers Elementary	Torrance	54.5
	Valor Christian Academy	Redondo Beach	53.4
	Washington Elementary	Redondo Beach	45.8
	Adams Middle School	Redondo Beach	42.3
	Bert Lynn Middle School	Torrance	42.3
	Beach Cities Child Development Centre	Redondo Beach	50.9
	Magruder Middle School	Torrance	52.8
	Edison Elementary	Torrance	47.8
	North High School	Torrance	47.8
Edison Corridor	Bert Lynn Middle School	Torrance	44.2
	West High School	Torrance	40.4

Overall, the predicted daytime noise levels from mitigated project activities are within or below levels expected in urban areas during the day. The predicted daytime noise levels for schools located in the general vicinity of the proposed Project Site ranges from 2.2 dBA to 25.7 dBA. The highest predicted noise level is from Phase 1 demolition (Hermosa Valley School), which is still well-below a level that would pose a potential health concern. Pipeline construction would result is noise levels ranging from 23.4 dBA (Jefferson Elementary) to 54.5 dBA (Towers Elementary). Although pipeline construction is expected to be short-term in duration (approximately 1 week at any one location), it will occur during daytime hours when school is in session. Therefore, the recommendation to provide written notification of pipeline construction activities is also extended to local schools.

The impact of a change in noise emissions due to the proposed Project on the health of the community are provided in Table 5-25. The impact of noise emissions on the local community, particularly residents located around the Project Site and along the pipeline and truck routes is negative without the use of mitigation measures. The EIR has identified a variety of mitigation techniques to reduce the potential impact of noise from the proposed Project on the surrounding community.

Table 5-25 Noise and Light Assessment: Noise Emissions

Health Determinant	Noise Emissions
Potential Health Outcome	Annoyance, stress, sleep disturbance and hypertension, and cognitive impairment at very high sound pressure levels
Pre-Mitigation Discussion	Negative health outcomes associated with elevated levels of noise may result from all Phases of the proposed Project with no mitigation measures in place
EIR Mitigation	Noise mitigation measures: Phase 1: NV-1a to NV-1c Phase 2: NV-2a to NV-2j; NV-3a to NV-3d Phase 3a (site construction): NV-4a to NV-4c Phase 3b (pipeline construction): None Phase 4: NV-6a to NV-6h; NV-7a to NV-7c
Geographic Extent	Phase 1-4: Localized (Project Site and truck/pipeline routes)
Vulnerable Populations	Residents and schoolchildren in proximity to pipeline route
Magnitude	Phase 1: Low Phase 2: Low Phase 3a (site construction): Low Phase 3b (pipeline construction): Medium Phase 4: Low
Adaptability	Phase 1: High Phase 2: High Phase 3a (site construction): High Phase 3b (pipeline construction): Medium Phase 4: High
Likelihood	Phase 1: Possible Phase 2: Possible Phase 3a (site construction): Possible Phase 3b (pipeline construction): Probable Phase 4: Possible
Post-Mitigation Health Effect	Phase 1: No substantial effect Phase 2: No substantial effect Phase 3a (site construction): No substantial effect Phase 3b (pipeline construction): Negative Phase 4: No substantial effect
Comments or Additional Recommended Measures	In anticipation of potential elevated noise levels from pipeline construction activities (Phase 3b) it is recommended that local residents and local schools be provided with written notification of impending work including the dates and times of activities that may produce excessive noise.

The geographic extent of noise emissions from all Phases of the proposed Project is **'localized'** since any potential noise impacts will occur within the vicinity of the Project Site or along pipeline or truck routes. The vulnerable populations identified for noise emissions are **'residents and schoolchildren in proximity to pipeline route'**. Additionally, since it is well established that noise decreases with increasing distance from the source, noise emissions will likely be limited to the areas adjacent to Project-related activities. The post-mitigation magnitude of noise-related health effects s for Phase 1,2, 3a (site construction) and 4 are **'low'** since noise levels are below the limit of 45 dBA established by the Hermosa Beach Oil Code or they are within typical noise levels experienced in urban/commercial areas. The post-mitigation magnitude of noise-related health effects for Phase 3b (pipeline construction) is considered **'medium'** since the impact is detectable, it is reversible, and poses a minor to moderate hazard to health. Although noise levels will be moderately high, construction is limited to daytime hours (Monday-Friday 8:00 am to 6:00 pm) and is short-term (approx. one week). This would limit the potential for serious health implications.

Adaptability to post-mitigation activities in Phase 1, 2, 3a (site construction) and 4 is considered to be **'high'** since noise levels are within typical levels for urban/commercial land use and people will be able to adapt to the change and maintain pre-project level of health. Adaptability for Phase 3b (pipeline construction) is considered to be **'medium'** since the noise emissions will be higher than in the other Phases (albeit short in duration) and people will be able to adapt to the change with some difficulty and will maintain pre-project level of health, although some support may be necessary. The likelihood of noise emissions from Phase 1, 2, 3a (site construction) and 4 is **'possible'** since noise emissions from these Phases have the potential to occur on a regular basis; however, the change may not be perceptible and is not expected to influence health status. The likelihood of noise emissions from Phase 3b (pipeline construction) is **'probable'** since it has been demonstrated that high level of noise will occur during pipeline construction and residents in the immediate vicinity will likely experience annoyance and increased stress during this time. Overall, there is considered to be **'no substantial effect'** for Phase 1, 2, 3a (site construction) and 4 on the health of the community as a result of noise emissions from the proposed Project. However, there is a potential for **'negative'** impacts (annoyance and stress) from the short-term high-level noise emissions associated with pipeline construction activities in Phase 3b. Therefore, for Phase 3b (pipeline construction), it is recommended that local residents and local schools be provided with written notification of the impending work that identifies the potential for excess noise and outlines the location and duration (expected to be short-term: 1 week) of the impacts.

5.5.2 Light Emissions

5.5.2.1 Light and Health

Light can be emitted from both natural and human sources and increase productivity, visibility and safety. Conversely, unwanted sources of light have collectively been identified as light pollution and artificially illuminate the night sky. With respect to light pollution, Chepesiuk (2009) states that:

> *"Light pollution comes in many forms, including sky glow, light trespass, glare, and overillumination. Sky glow is the bright halo that appears over urban areas at night, a product of light being scattered by water droplets or particles in the air. Light trespass occurs when unwanted artificial light from, for instance, a floodlight or streetlight spills onto an adjacent property, lighting an area that would otherwise be dark. Glare is created by light that shines horizontally. Over illumination refers to the use of artificial*

light well beyond what is required for a specific activity, such as keeping the lights on all night in an empty office building."

Many commercial and industrial developments require the use of artificial lighting for safety and operation. Since these types of developments are often placed in proximity to residences, the potential impacts of additional light sources (positive and negative) are an important consideration.

The invention and widespread use of artificial light, especially at night, has become a necessity in many areas of the world to enhance commerce, promote social activity, and increase public safety (Blask et al., 2012). The amount of artificial light used for residential, commercial and industrial purposes across the United States has dramatically increased within the past several decades (Figure 5-5). In Europe, over half the population has lost the ability to see the Milky Way with the naked eye. Moreover, 99% of the population of Europe and the United States (excluding Hawaii and Alaska) live in areas where the night sky is brighter than the threshold for light-polluted status set by the International Astronomical Union (i.e., artificial sky brightness is >10% of natural sky brightness above 45 degrees of elevation). This can be contrasted against only 63% of the world's population living in areas exceeding the light-pollution threshold, indicating that higher levels of artificial light-at-night are associated with more developed nations (Chepesiuk, 2009).

Despite the fact that the use of artificial light is a widespread consequence of industrial and economic development, it can have unintended negative consequences, especially when it becomes inefficient, annoying and unnecessary (Chepesiuk, 2009; Falchi et al., 2011). According the National Park Service, approximately 50% of the light from a typical unshielded light fixture is wasted, shining upward where it is not necessary, 40% shines downward to illuminate the intended target and 10% is emitted horizontally, which can cause glare. Therefore, the International Dark-Sky Association recommends "that all lighting be installed such that no light is emitted above a horizontal plane running through the lowest part of the fixture" and that good lighting is shielded in a manner that directs all of the light to where it is wanted and needed (Chepesiuk, 2009).

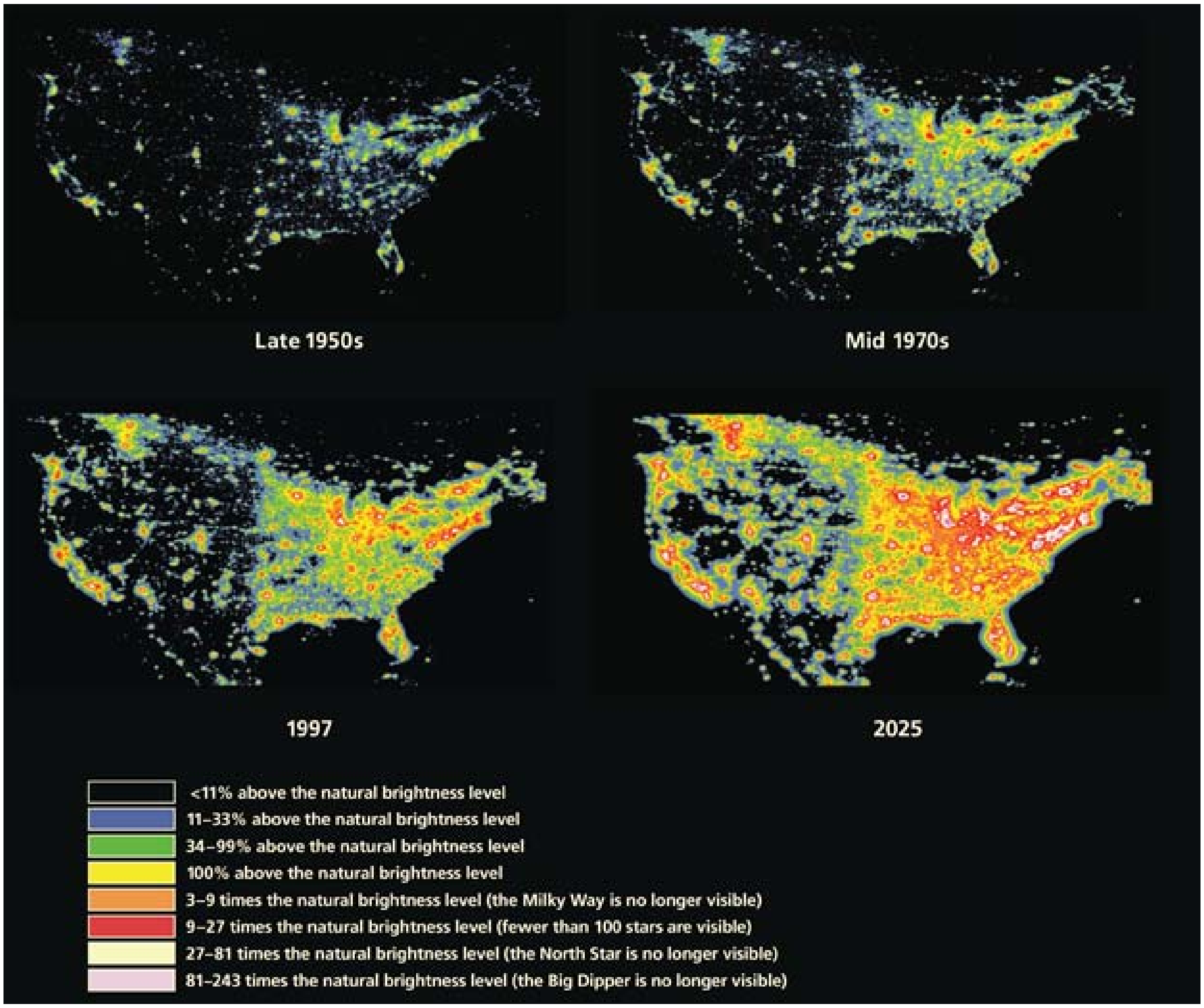

Figure 5-5 Increase in Artificial Night Sky Brightness in North America (Chepesiuk, 2009)

In the environment, artificial light can affect wildlife species and other ecosystem components through the alteration of diurnal light and dark patterns which are involved in regulating migration, reproduction, and predator-prey relations (Gotthard 2000; Lorne & Salmon 2007; Moore et al. 2000). Furthermore, light pollution can impact plants due to the artificial polarization of light which regulates natural polarization of sunlight involved in photosynthesis (Horváth et al. 2009). These findings have contributed to a growing interest in exploring potential effects of artificial light on human health. However, uncertainty remains as to whether artificial light poses human health risks, and if so, to what extent and magnitude (Kantermann & Roenneberg, 2009).

Studies on light pollution have found that artificial light has the potential to influence biological processes in humans. Blask et al. (2012) stated that "light is the most powerful stimulus for regulating human circadian rhythms and is the major environmental time cue for synchronizing the circadian clock." The presence or absence of light influences the production of melatonin, which is involved in the regulation of many physiological systems in mammals, such as the sleep/wake cycle, reproduction, cardiovascular system and blood pressure, including energy metabolism and energy balance (Amaral, 2014). “Melatonin is one of the most studied biomarkers of the human physiological response to light. This substance is the biochemical correlate of darkness and is only produced at night, regardless of whether an organism is day-active (diurnal) or night-active (nocturnal). Conceptually, melatonin provides an internal representation of the environmental photoperiod, specifically night-length” (Blask et al., 2009). However, it is important to note that light is not required to generate circadian rhythms or produce melatonin. For example, individuals who are completely blind do not experience light-dark cycles, yet they generate circadian rhythms close to a 24-hour cycle (Blask et al., 2009).

It was initially thought that very bright light (>2,500-20,000 lux) was required to suppress the production of melatonin and disrupt the rhythm (e.g., as in jet lag) in humans. However, it has since been suggested that suppression of melatonin production can occur in normal human volunteers from light levels as low as:

- 5 lux of monochromatic blue light;
- 5-17 lux of monochromatic green light;
- <100 lux of white fluorescent light; and,
- 100 lux of broadband white light.

In a study conducted by Cho et al. (2013) it was found that sleeping with lights on (40 lux fluorescent) was associated with longer periods of shallow sleep and more frequent arousals. Typical lighting in residences (i.e., night lights, hallway/bathroom lighting, and television or computer illumination) can also suppress melatonin during the night; however, studies investigating light at night have suggested that human circadian rhythms are wavelength dependent. These findings indicate that human melatonin levels are most sensitive to exposure to short wavelengths, or blue light, and that this should be considered in the context of controlling illumination (Lockley et al., 2003).

There is a theory regarding the use of “light-at-night” (LAN) and the potential link to cancer. This theory was largely developed based on studies conducted on shift workers and the International Agency for Research on Cancer (IARC) classification of “shift work that involves circadian disruption” as potentially carcinogenic (Kantermann and Roenneberg, 2009). The LAN hypothesis is “based on the following chain of arguments: melatonin is a hormone produced under the control of the circadian clock at night, and its synthesis can be suppressed by light; as an indolamine, it potentially acts as a scavenger of oxygen radicals, which in turn can damage DNA, which in turn can cause cancer” (Kantermann and Roenneberg, 2009). Despite the fact that this theory has attracted a lot of attention, there is no experimental evidence that LAN is the basis of increased cancer incidence in shift workers (Kantermann and Roenneberg, 2009). Furthermore, Stevens (2009) has stated “The LAN theory is easy to state but difficult to assess scientifically. Virtually no sighted person in the modern world does not use electric light to reduce the length of the natural daily dark period. This is also increasingly true in the developing world. Finding appropriate comparison groups is difficult.” Additionally, Blask et al. (2012) has found that limited epidemiological studies support the hypothesis of nighttime lighting and/or disruption of circadian rhythms increasing cancer risk. They identify the importance of epidemiological studies as a critical component of assessing whether or not there is a link between light exposure and disease risk in humans; however, they point out that these studies are observational and thus "can rarely provide mechanistic understanding of the association" (Blask et al., 2009).

Finally, it is important to consider the extent of the use of artificial light at night and the fact that we have been prolonging 'daytime' for many decades, especially in developed countries. It is also important to consider the tradeoff between positive uses of light (i.e., traffic and street lights, safety, increased production and time for recreational activities), and excess, inefficient or unnecessary lighting (i.e., light pollution). "Almost everyone in modern society uses electric light to reduce the natural daily dark period by extending light into the evening or before sunrise in the morning...on that basis, we are all exposed to electric light at night" (Chepesiuk, 2009).

5.5.2.2 Current Conditions

Hermosa Beach is a city of approximately 20,000 residents located just over 20 miles from downtown Los Angeles. Within the city limits there are residential, commercial and industrial land uses. The proposed Project Site is a maintenance yard that is located within an area containing residential, commercial and light industrial uses. The buildings surrounding the Site are comprised primarily of one to three-story structures. During nighttime hours, the surrounding area is characterized by moderate levels of interior and exterior lighting for nighttime activities, security, parking, and signage. The majority of these light sources are shielded and directed towards the ground to maximize efficiency and minimize ambient glare. Light from interior lighting from windows and porches of the residential uses contribute to the ambient nighttime levels. Other exterior lighting sources include pole-mounted street and traffic signal lighting along city streets.

The EIR included a baseline evaluation of the local light emissions on the proposed Project Site and surrounding areas. The following are the findings from the EIR report (MRS, 2014):

- **Clark Stadium:** The most significant night time lighting observed in the Project area was from Clark Stadium where light levels exceeded 35 footcandles (as measured at the tennis courts adjacent to Valley Drive). Using a typical conversion (1 footcandle = 10.8 lux), Clark Stadium emits approximately 377 lux at night. This is roughly equivalent to the lighting that would be experienced in a typical residential or office setting (WOT, 2014). Lighting near or exceeding this level is evenly distributed across the active use areas of the park site.
- **South Park:** South Park light levels were considerably lower than around Clark Stadium with only occasional low-level light fixtures along the main path and parking area.
- **Greenbelt:** The Hermosa Greenbelt adjacent the Project Site is not lit at night.
- **Residential:** Interior lighting spill-over from windows and porches of the residential uses contribute to the ambient nighttime levels.
- **Green spaces:** Lower light levels are located on undeveloped parcels, non-active-use parks and open spaces.

- **Proposed Project Site:** Light levels generated within the Project Site are low to moderate. Light sources include exterior security lighting on building facades and light poles located in the surface of parking areas. The buildings and tanks on the Project Site have painted metal finishes and do not contain large glare-producing windows. Existing fixtures are not full cut-off and some light spill into the night sky was observed.
- **Proposed Maintenance Yard:** Light levels generated at the Proposed City Maintenance Yard Site are low to moderate. Light sources include exterior security lighting on building facades and light poles located in the surface of parking areas on the east third of the site. Existing fixtures are not full cut-off and some light spill into the night sky was observed.

With the exception of Clark Stadium (which increases light levels in the area when it is used at night) the character, intactness and unity of the lit environment is fairly uniform and consistent with a Lighting Zone 2 (LZ-2) (MRS, 2014).

5.5.2.3 Project Impact

A potential increase in the presence of artificial light sources varies depending on the Phase of the proposed Project. The EIR points to several plans and policy documents that identify regulations and guidelines for aesthetics, visual resources, vistas, light and glare that relate to the development of the Proposed Project. These include the California Coastal Act, City of Hermosa Beach General Plan, City of Redondo Beach General Plan, City of Torrance General Plan, and local planning and zoning ordinances. Light emissions from the proposed Project are evaluated regarding their potential to impact human health with the assumption that all mitigation measures in the EIR pertaining to light and glare are implemented.

<u>Phase 1:</u>

The first phase of the proposed Project would occur for a period of approximately six months. During this time, demolition or construction activities would occur on the Project Site during daytime hours (Monday-Friday 8 am to 6 pm; Saturday 9 am to 5 pm), which is consistent with the City Municipal Code. Since the Phase 1 activities will be occurring only during the day, no nighttime lighting is necessary. Outside of the Project Site, existing street lighting located on Valley Drive and 6th Street will be sufficient. Therefore, an assessment of light emissions from Phase 1 of the proposed Project is not necessary for the current HIA.

<u>Phase 2:</u>

The second Phase of the proposed Project would occur on a continuous basis (day and night) for approximately twelve months. During this Phase, four wells would be drilled utilizing an electric drill rig and temporary production equipment would be installed and used to process the extracted oil, gas, and water. Phase 2 will require the use of temporary nighttime lighting for Site security and worker safety consistent with the requirements of the City. To address Site security, temporary pole mounted low-energy light fixtures at a height of 10 ft will be provided at the Site entrance and exit. These lights would be shielded/hooded and downcast so that it would not create light spill or glare beyond the property line (MRS, 2014). Additionally, temporary lighting (two 150-watt light fixtures) would be provided for the temporary construction trailer. Each fixture would be shielded/hooded and downcast so that it would not create light spill or glare, and the construction trailer would be located behind a 32-foot sound attenuation wall that would block any light spill or glare from leaving the Project Site (MRS, 2014).

For the safety of on-site workers, lighting would be provided for the electric drill rig. Lighting for the drill rig will require pole-mounted lights approximately 15 feet above the rig platform and on the drill rig mast, which would start approximately 19 feet above ground surface and extend upward to approximately 87 feet. The drill right will be enclosed with an acoustical cover on three sides. The lights will face inward to provide workers with an ambient glow for visibility and safety purposes. All light fixtures would be shielded, hooded and downcast, and would be located behind the 32 foot sound attenuation wall, which will significantly reduce operational light spill or glare beyond the Site perimeter, with the exception of the drill rig mast which extends up to 87 feet. Additionally, the EIR stipulates that "lighting shall be limited solely to the amount and intensities necessary for safety and security purposes" and that "the use of architectural lighting beyond safety and security requirements shall be prohibited" (MRS, 2014).

Due to the presence of the electric drill rig, which extends above the height of the sound attenuation wall, there is potential for additional light emissions in the surrounding area. Therefore, an assessment of potential health impacts from the presence of additional nighttime lighting from the electric drill rig (Phase 2) is necessary for the HIA.

Phase 3:
The third phase would occur for a period of approximately fourteen months. Grading and construction activities would occur on the Project Site between 8 am and 6 pm Monday to Friday and 9 am to 5 pm on Saturdays, as per the Municipal Code. No nighttime lighting will be required for the Project Site and the perimeter of the Project Site would be illuminated by the existing street lights on Valley Drive and 6th Street. Therefore, an assessment of light emissions from Phase 3 of the proposed Project is not necessary for the current HIA.

Phase 4:
The fourth, final phase would occur for a period of approximately thirty to thirty-five years. During Phase 4 of the Proposed Project, remaining wells would be drilled utilizing an electric drill rig and production equipment would be installed and used to process the extracted oil, gas, and water (MRS, 2014). Lighting will be required for Site security and worker safety, including light fixtures (150-watt) at the entrance and exit mounted on the perimeter wall at a height of approximately 15 ft. The light fixtures would be shielded/hooded and downcast so that they would not create light spill or glare beyond the property line (MRS, 2014). Lighting would also be provided for the small office building and would consist of a 150-watt light fixture wall-mounted at the building entrance at a height of 10 ft. The light on the office building would be located behind the 16-foot split-faced block wall, which would block any light spill or glare from leaving the Project Site. To address worker safety, lighting would be provided for the drill rig and drill rig platform as discussed above for Phase 2. Further, any maintenance activities on the Project Site that would require the use of a workover rig would occur during daylight hours (8 am to 6 pm); therefore, no nighttime lighting would be required (MRS, 2014).

Due to the presence of the electric drill rig, which extends above the height of the sound attenuation wall, there is potential for additional light emissions in the surrounding area. Therefore, an assessment of potential health impacts from the presence of additional nighttime lighting from the electric drill rig (Phase 4) is necessary for the current HIA.

Presence of Electric Drill Rig (Phase 2 and 4):
The EIR provides an illustration to demonstrate the lighting on the drill rig mast that will be present during portions of Phase 2 and Phase 4 (Figure 5-6). During Phase 2 the drill rig would operate 24-hours per day, 7-days per week until the desired depth for each hole has been reached. It is estimated that this would take approximately 30 days per well (including installation, rigging and demobilization) for four wells, resulting in a total of 120 days for drilling activities. During Phase 4, which would occur for approximately 30-35 years, drilling would occur for the first 30 months to drill the remaining wells and re-drilling would occur over the life of the project when necessary (MRS, 2014). Although much of the light associated with drilling operations will be obstructed by the EIR mitigation measures (i.e., downcast, directional lighting and the 32-foot sound attenuation wall), the electric drill rig extends beyond the height of the wall that will be visible to the surrounding community.

Figure 5-6 View Simulation of Drilling Rig at Night (MRS, 2014)

Due to the design and construction of the electric drill rig (3-sided enclosure), it is anticipated that the majority of residents in the area will not be impacted from the light associated with drilling activities. However, since one side of the drill rig will be open and lighting is required for worker safety and visibility, there is the potential for some light spill or glare beyond the Site boundary. The EIR states the following with respect light emissions from the electric drill rig:

> *"The Applicant has stated that measures have been taken in this design to minimize potential for light spill and glare from the open side, however the interior faces of the acoustical shroud and the elements of the mast structure would catch light and would have the effect of producing a vertical lighted column visible from areas in the foreground, middleground and background areas. Views of the open (illuminated) side of the drill rig would be limited to the direction the open side faces. The pattern and scale of this illuminated feature would be out of character with existing nighttime views. Similar to day time impacts, this vertical feature would project above the horizontal plane of the existing illuminated environment and would become a focal element. The duration of exposure, number of sensitive viewers, and nature of the visual change would result in impacts that would be significant" (MRS, 2014).*

Therefore, people living within the direct sight line of the exposed portion of the drill rig may be disproportionately affected by nighttime lighting. In some instances, especially in sensitive individuals, the increase in light emissions has the potential to interfere with typical sleep cycles. It is recommended that black-out blinds or curtains be provided to residents with one or more bedroom windows with a direct line-of-sight of the exposed side of the electric drill rig, which will be lit at night for worker safety and visibility. Providing certain residents with blackout blinds/curtains will not only eliminate any potential for sleep disruption but it will also provide additional protection from existing outdoor light sources (i.e., street lights, other residences, commercial buildings, etc.) that are not related to the proposed Project.

Residents and visitors of Hermosa Beach can also potentially benefit from additional nighttime lighting including increased leisure-time, physical activity and commuting by foot or bicycle, as well as increased perception of safety (Velasquez et al., 2009). It is anticipated that these changes would be most evident in areas with high pedestrian traffic, along Valley Drive and portions of the Greenbelt in close proximity to the Site.

The impact of change in light emissions due to the proposed Project on the health of the community is provided in Table 5-26.

Table 5-26 Noise and Light Assessment: Light Emissions

Health Determinant	Light Emissions
Potential Health Outcome	Annoyance, stress and possible disturbance of typical sleep cycles
Pre-Mitigation Discussion	Negative health outcomes may occur from excess light and glare from the proposed Project during Phase 2 and 4 with no mitigation measures in place
EIR Mitigation	Light mitigation measures: Phases 2-4: AE-4a to AE-4c; AE-5a to AE-5e; AE-6a to AE-6b
Geographic Extent	Localized
Vulnerable Populations	People with a direct line-of-site of lit side of electric drill rig at night
Magnitude	Low
Adaptability	High
Likelihood	Unlikely
Post-Mitigation Health Effect	No substantial effect
Comments or Additional Recommended Measures	Although the magnitude is 'low' for the majority of residents, it could be higher for those individuals with a bedroom window in the direct line-of-sight of the exposed side of the electric drill rig that will be lit at night. It is recommended that these individuals be provided with black-out blinds or curtains to eliminate any potential impact to typical sleep patterns.

The geographic extent of light emissions is **'localized'** since the majority of light sources associated with the proposed Project have been mitigated in such a way that light spill or glare will be limited to the Site boundaries. The magnitude of the health effect in the area is expected to be **'low'** since the extent of the impact is minor and does not pose a significant hazard to health given the effectiveness of the proposed EIR mitigation measures to limit exposure to light emissions. The vulnerable populations identified for light emissions are **'people with a direct line-of-site of lit side of electric drill rig at night'**. Adaptability is determined to be **'high'** since the use of artificial light at night is ubiquitous in the United States, including in urban and suburban areas, and people will be able to adapt to the change with ease and maintain pre-project level of health. The likelihood of any resulting health effect from light exposure is **'unlikely'** since over the course of the proposed Project the presence of additional light will not be of concern (with potential exception of those with direct view of drill rig). Overall, there is considered to be **'no substantial effect'** on the health of the community as a result of light emissions from the proposed Project.

The most likely effect of light emissions from the proposed Project is annoyance and stress induced by an unwanted change in the local environment. Based on the EIR mitigation measures, including directed and downcast lighting and a 32-foot attenuation wall, it is not anticipated that there will be health impacts from light emissions from the proposed Project. For some people who have a direct line-of-sight from their bedroom window to the lit side of the electric drill rig, there is some potential for interference with typical sleeping patterns. For these individuals, it is recommended that black-out blinds or curtains be provided as an option to eliminate the potential for infiltration of light emissions from the nighttime lighting on the drill rig.

Moreover, this measure will provide an additional benefit by eliminating infiltration of existing outdoor lighting as well (e.g., traffic signals, street lights, nearby residences, etc.) that is not associated with the proposed Project.

5.5.3 Summary and Conclusions of Noise and Light Emissions

Noise is ubiquitous in suburban/urban and commercial areas. Health implications associated with exposure to excess noise are typically focused on nighttime sleep disturbance. Since the Project-related activities predicted to produce the highest noise levels were only permitted during daytime hours, nighttime impacts of noise are not a primary concern in the current HIA. The impact of Project-related noise emissions on the local community, particularly residents located around the Project Site and along the pipeline and truck routes is negative without the use of mitigation measures; however, the EIR has identified a variety of mitigation techniques to reduce the potential impact of noise on the surrounding community including a 35-foot acoustical barrier around the Project site. Based on the current HIA, there is expected to be no substantial effect on human health resulting from project activities in Phases 1, 2, 3a (site construction) and 4. There is some potential for negative health effects from high levels of noise associated with pipeline construction (Phase 3b); however, this is expected to be short-term in duration (approx. one week per location) and is limited to daytime hours. Therefore, for Phase 3b (pipeline construction), it is recommended that local residents and local schools be provided with written notification of the impending work that identifies the potential for excess noise and outlines the location and duration of the impacts.

The noise assessment within the HIA concludes that, with implementation of the proposed EIR mitigation measures, there is no substantial effect on human health from Phase 1, 2, 3a (site construction) and 4, and a potential negative impact from pipeline construction activities in Phase 3b. Therefore, it is recommended that written notification be provided to residents and schools in the vicinity of these activities that identifies the potential for excess noise and outlines the location and duration of the

The invention and widespread use of artificial light, especially at night, has become a necessity in many areas of the world to enhance commerce, promote social activity, and increase public safety. Despite the fact that the use of artificial light is a widespread consequence of industrial and economic development, it can have unintended

The light assessment within the HIA concludes that, with implementation of the proposed EIR mitigation measures, there is no substantial effect on human health with respect to light emissions; however, there is potential for nearby individuals to experience disruption of typical sleep patterns. Therefore, it is recommended that black-out blinds/curtains be provided as an option for residents whose bedroom window(s) are in the direct line-of-sight of the exposed portion of the electric drill rig to eliminate any infiltration of outdoor lighting.

negative consequences, especially when it becomes inefficient, annoying and unnecessary. The major health concern related to excessive light-at-night is disruption of sleep and biological circadian rhythms which influence melatonin production and promote overall health. To ensure visibility, site security and worker safety artificial lighting will be installed as part of the proposed Project. The majority of the on-site lighting will be shielded and downcast to reduce glare. Additionally, the site will have a 32-foot acoustical barrier that will eliminate light spill beyond the Site boundary in most cases. The one exception to this is the presence of lighting on the electric drill rig, which extends up to 87 feet. Residents who have a line-of-sight view of the exposed side of the electric drill rig from their bedroom window(s) may be disproportionately impacted. For these individuals, it is recommended that black-out blinds or curtains be provided to eliminate the potential for infiltration of light emissions from the nighttime lighting on the drill rig.

5.6 Traffic

The traffic assessment focuses on the potential impacts the proposed project may have on traffic safety and the impact that the perceived decrease in pedestrian safety could have on active transportation.

5.6.1 Traffic Injury

5.6.1.1 Traffic and Health

Vehicular traffic is a well-known potential safety hazard. Traffic safety hazards are associated with a number of factors, including vehicle volume, vehicle type, road infrastructure, driving behavior, and population density. Increases in traffic volume are associated with increased risk of injury and death due to vehicle-vehicle, vehicle-pedestrian, and vehicle-bicycle collisions. Pedestrian injury collisions often occur in areas with large numbers of pedestrians and high traffic flow. According to a model of vehicle-pedestrian accidents developed using census tract level data from San Francisco, a 15% increase in census-tract traffic volume is associated with an approximate 11% increase in vehicle-pedestrian injury collisions (Wier et al., 2009). In a study of nine intersections in Boston's Chinatown, researchers calculated an increase in three to five injuries per year for each increase in 1,000 vehicles (Brugge et al., 2002). An analysis of pedestrian injury at roadway intersections in Oakland, California found that the risk of collision for pedestrians increases with higher traffic vehicle flow, as well as with commercial and mixed-use areas when compared to only residential areas (Geyer et al., 2005). Vehicle-pedestrian accidents disproportionately impact the elderly and the very young, due to slower walking speeds and slower reaction times (US DOT, 2012).

Large truck crashes are associated with an increased severity of injury to the occupants of other vehicles involved in the crashes. According to the National Highway Traffic Safety Association, in 2011 large trucks were associated with 3,757 fatalities in the United States. Of these fatalities, 72 percent were occupants of other vehicles, 11 percent were pedestrians or bicyclists, and 17 percent were occupants of the large trucks (NHTSA, 2013).

5.6.1.2 Current Conditions

Traffic on streets in Hermosa Beach consists of motorists who live, work, recreate, and shop in the City, as well as motorists who are passing through but do not stop for any reason. Commuter traffic is primarily concentrated on Pacific Coast Highway (PCH). Streets parallel to PCH (Ardmore Ave., Highland Ave., Valley Dr., and Prospect Dr.) also absorb some of the spillover commuter traffic. Traffic counts were collected on roadway segments of Pier Ave, Valley Drive, and Herondo Street in mid-July 2013 to specifically establish baseline truck traffic in the vicinity of the Site. Based on the three-day traffic count data, daily averages of 55 two- and three-axle trucks (medium trucks) were counted along Valley Drive, between Pier Avenue and Herondo Street. No four-(or more) axle trucks were counted during the three-day traffic count (Arch Beach Consulting 2013). While current pedestrian or bicyclist counts are not available, Hermosa is considered a pedestrian and bike-friendly city. A detailed description of the existing transportation conditions near the project Site can be found in the EIR (Section 4.13.3).

The baseline health assessment found that fatalities resulting from motor vehicle collisions in Hermosa are currently very rare (see Appendix E). There were zero reported fatalities from any type of collision in Hermosa from 2009 to 2011; data from recent years is not yet available (CHP 2014). While vehicle-vehicle accidents are far more common than vehicle-pedestrian and vehicle-bicycle accidents, pedestrians and bicyclists are more likely to suffer from injuries and severe injuries as a result of the collision compared to motorists or vehicle passengers. On average, from 2009 to 2011 in Hermosa, 100% of reported vehicle collisions involving pedestrians resulted in an injury, 91% of vehicle collisions involving bicycles resulted in an injury, and 35% of vehicle collision with another vehicle or stationary object resulted in an injury. There are certain streets where pedestrians are more vulnerable to collision with a vehicle, including PCH, Pier Ave., Hermosa Ave., and Beach Drive (see Appendix E).

5.6.1.3 Project Impact

During Phase 1 of the proposed Project, there would be demolition and construction activities resulting in various vehicles traveling to and from the Site. Construction improvements to the intersection of 6th St./Valley Dr. will provide the necessary turning radius for project-related trucks turning southbound on Valley Dr. from 6th St. (construction would include the relocation of a stop sign and striping, removal of utility pole and utilities, and the removal of parking spaces).

During Phase 2, processed oil would be removed from the Site by truck and delivered to an off-site location. During Phase 2 and Phase 4 drilling, the electric drill rig, with an approximately 87-foot high rig mast and its associated equipment would be brought to the Site on large trucks with trailers permitted by the City and the California Highway Patrol. Other temporary and permanent production equipment would also be brought to and from the Site by large trucks with trailers. A trucking safety program would be implemented to address potential trucking risks associated with the transport of the processed oil to an off-site location.

During Phase 3, there would be construction activities resulting in various vehicles traveling to and from the Site, including trucks used in the export of soil during the implementation of the Remedial Action Plan at the Site. In addition, there would be construction activities associated with the installation of off-site pipelines resulting in short-term road closures in the Cities of Hermosa Beach, Redondo Beach, and Torrance. Other design features of Phase 3 would include the installation of new curbs, gutters, and sidewalks along the frontage of the Site on Valley Dr. and 6th St.

As described in the EIR (MRS, 2014), the proposed project will be implemented consistent with Resolution No. 93-5632, approved on August 12, 1993, for a Conditional Use Permit (CUP), including the following traffic requirements:

- All truck deliveries shall be limited to daylight hours (9:00 am – 3:00 pm), Monday through Friday;
- The number of truck trips shall be limited to a maximum of 18 round trips per day, except for an emergency situation;
- Project related truck travel shall be restricted to specific truck routes and access points as approved by the Public Works Department. Signs shall be installed to direct detour traffic as approved by the Public Works Director;
- Site access shall be designed to enable trucks to turn into the site without inhibiting traffic movement on Valley Drive or 6th Street;
- Areas of construction and maintenance activities [for the pipeline construction] shall be delineated by signs, flagmen, pavement markings, barricades, and lights, as determined by permit requirements of all local agencies; and,
- Where pedestrian activities are affected during [pipeline] construction, appropriate warning signs shall be installed and pedestrians will be diverted. Pedestrian access to business and residences will be maintained during construction. Special facilities, such as handrails, fences, and walkways shall be provided, if necessary, for the safety of pedestrians.

The proposed project would also include implementation of a City-approved Pedestrian Protection Plan during Phases 1 and 3 to provide specific pedestrian protection measures during periodic sidewalk closures along Valley Drive throughout Phase 1 (during week 5, between weeks 6 and 13, between weeks 58 and 59, and between weeks 60 and 61) and Phase 3 (first five weeks, between weeks 5 and 8, between weeks 9 and 11, and between weeks 26 and 27).

A Traffic Impact Analysis (TIA) prepared by Arch Beach Consulting in November, 2012 (with an August 2013 Technical Memorandum Addendum) identifies intersections and roadway segments that could be impacted by the proposed project, establishes baseline traffic conditions, and estimates the level of traffic that would be generated during construction and operation, and compares traffic conditions with and without the proposed project (Arch Beach, 2012; 2013).

The TIA applies a Passenger Car Equivalence to all trucks generated by the proposed project to assess the truck traffic generated by the proposed project against road capacity during the morning and evening peak commute hours, which contain primarily passenger cars. Table 5-27 provides trip generation rates, in terms of Passenger Car Equivalence, for each phase of the proposed project. Based on the adjusted trip generation methodology, Phase 1 would generate 110 daily trips, Phase 2 would generate 170 daily trips, Phase 3 would generate 218 daily trips, Phase 4 would generate 152 daily trips, and the ongoing operations would generate 44 daily trips. The heaviest traffic would occur during Phase 3 final design and construction, lasting approximately 16 months.

Additionally, the TIA performed average daily traffic counts from 33 roadway segments and 44 intersections potentially impacted by the proposed project (Figure 5-7). To evaluate the proposed project's potential impact on roadway segments and intersections, the total PCE trips associated with each phase of the proposed project was added to each intersection to determine if there was a potential to exceed significance criteria. The significance criteria in the EIR traffic assessment was based on level of service ratings, or degree of traffic congestion at intersections.

Table 5-27 Project Trip Generation Estimates (*Arch Beach Consulting, 2012*).

Construction Activity	Vehicle Type	Daily (PCE) In	Out	Total
PHASE 1 – SITE PREPARATION PEAK ACTIVITY	3+ axle truck (3.0)	45	45	90
	2 axle trucks (2.0)	0	0	0
	Cars-pickups (1.0)	10	10	20
Total with PCE		**55**	**55**	**110**
PHASE 2 – EXPLORATORY DRILLING AND TESTING PEAK ACTIVITY	3+ axle truck (3.0)	54	54	108
	2 axle trucks (2.0)	3	3	6
	Cars-pickups (1.0)	25	25	50
Total with PCE		**85**	**85**	**170**
PHASE 3 – FINAL DESIGN AND CONSTRUCTION PEAK ACTIVITY	3+ axle truck (3.0)	54	54	108
	2 axle trucks (2.0)	0	0	0
	Cars-pickups (1.0)	55	55	110
Total with PCE		**109**	**109**	**218**
PHASE 4 – DEVELOPMENT AND OPERATION PEAK ACTIVITY	3+ axle truck (3.0)	36	36	72
	2 axle trucks (2.0)	8	8	16
	Cars-pickups (1.0)	32	32	64
Total with PCE		**76**	**76**	**152**
OPERATIONAL PHASE – LIFE OF PROJECT PEAK ACTIVITY	3+ axle truck (3.0)	12	12	24
	2 axle trucks (2.0)	2	2	4
	Cars-pickups (1.0)	8	8	16
Total with PCE		**22**	**22**	**44**

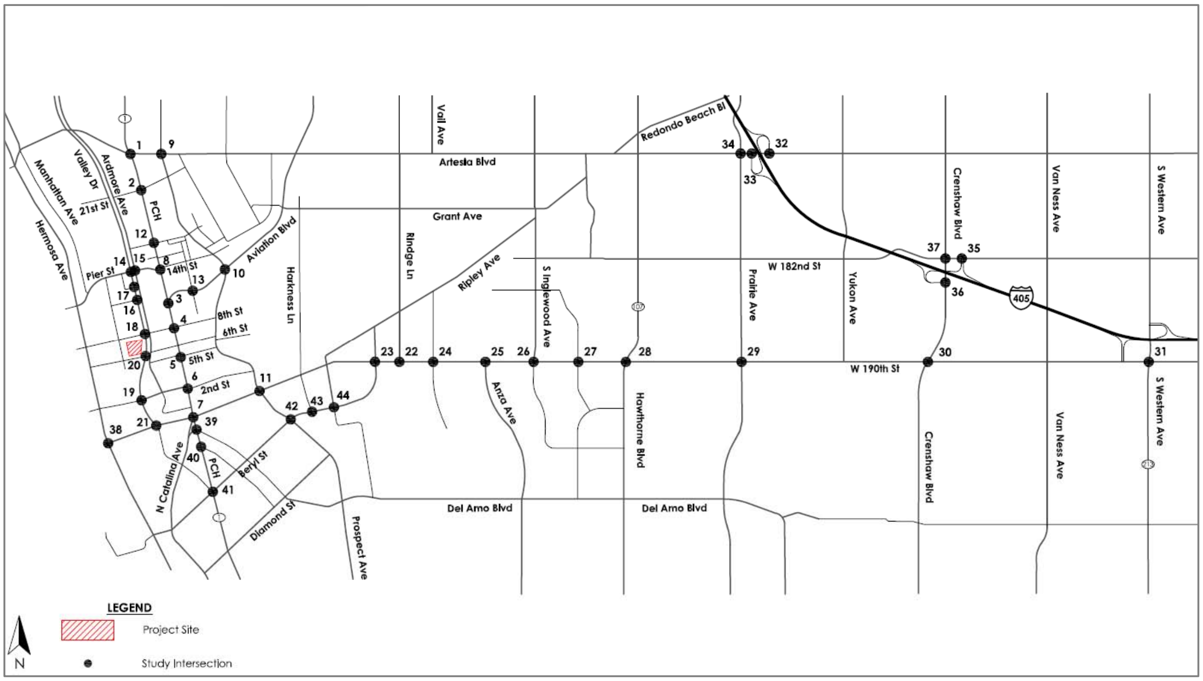

Figure 5-7 Project Site Location and Traffic Impact Assessment Study Area (MRS, 2014)

The TIA-calculated percent increases over baseline traffic counts are overall very small for individual road segments (usually less than 1%). The greatest percent increase in traffic is projected for the roadway segment on 6th St. from Valley Dr. to Hermosa Ave (Arch Beach Consulting, 2013). Results of the roadway segment analysis for the roadway segment on 6th St. from Valley Dr. to Hermosa Ave. during each project phase are summarized in Table 5-28. During Phase 3, lasting approximately 16 months, traffic is projected to increase by over a third during morning and evening peak hours (33.5%). Still, the existing use of the roadway is much less than capacity (i.e., 806 daily trips out of capacity for 2,500), and therefore does not have a significant impact on traffic congestion. Overall, the TIA concluded that project-related traffic would not significantly impact the level of service on any of the studied roadway segments. The finding of no significant impact is primarily because (1) current traffic at some impacted intersections is below capacity, or (2) the number of additional vehicles per day at other heavily-traffic intersections is small relative to current traffic volumes.

Table 5-28 Roadway Segment Analysis, 6th St from Valley Dr to Hermosa Ave (Arch Beach Consulting, 2012).

Construction Activity	Time	Capacity	Existing	Existing + Ambient (2015)	Existing + Ambient + Project	% Impact
PHASE 1 – SITE PREPARATION PEAK ACTIVITY	am	200	72	73	89	8%
	pm	200	73	74	90	8%
	daily	2,500	806	812	922	4.4%
PHASE 2 – EXPLORATORY DRILLING AND TESTING PEAK ACTIVITY	am	200	72	73	109	18%
	pm	200	73	74	110	18%
	daily	2,500	806	812	982	6.8%
PHASE 3 – FINAL DESIGN AND CONSTRUCTION PEAK ACTIVITY	am	200	72	73	140	33.5%
	pm	200	73	74	141	33.5%
	daily	2,500	806	814	1,032	8.7%
PHASE 4 – DEVELOPMENT AND OPERATION PEAK ACTIVITY	am	200	72	73	107	17%
	pm	200	73	74	108	17%
	daily	2,500	806	819	971	6.1%
OPERATIONAL PHASE – LIFE OF PROJECT PEAK ACTIVITY	am	200	72	76	87	5.5%
	pm	200	73	77	88	5.5%
	daily	2,500	806	845	889	1.8%

Based on the TIA, the EIR indicates that project-related traffic will not have a significant impact on traffic congestion according to level of service criteria. However, level of service criteria were derived for determining impacts to roadway capacity rather than impacts to traffic-related injury. Further, traffic volume is only one component of traffic-related safety. Type of vehicle, vehicle speed, and driving behavior also affect risk of traffic accidents. As discussed in the description of current conditions, there were no heavy truck trips on Valley Dr. during the three day count period in July 2013. The increased truck traffic, particularly given the baseline of zero heavy trucks, could represent a safety hazard to bicyclists and pedestrians.

The restriction of truck trips to between the hours of 9:00 am and 3:00 pm minimizes the possibility that trucks will be on the roadways while children are walking to and from school. Students walking to Hermosa Valley School are expected to be in school in the morning (as early as 8:15 am) prior to trucks being on Valley Drive. As the regular school day ends as early as 2:48 pm for some students, trucks would still utilize Valley Drive while students are walking on adjacent sidewalks. In addition, Hermosa Valley School has days when students are dismissed as early at 12:15 pm. Also, on Wednesdays, school is dismissed earlier at 1:45 pm for some students (HBCSD, 2014).

The EIR recommends mitigation measures TR-1a through TR-1d to reduce the impact associated with the introduction of truck trips in close proximity to sensitive receptors to less than significant. In summary, those mitigation measures include (MRS, 2014):

- Increased crossing guard presence near the Site;
- Installation of warning signs/yellow lights that warn drivers of the approaching area where trucks may be entering the roadway;
- Ensuring that trucks are not too long (<65 feet) to hang over onto Ardmore Avenue when utilizing the Pier Avenue and Valley Drive intersection. If trucks are longer than 65 feet, then a flagger should be used at that intersection; and,
- For Phases 1-3, the Applicant shall either (1) convert Valley Drive to one-way to increase lane width and enhance pedestrian and bicyclist access (consistent with the recommendation in the Beach Cities Livability Plan [WLCI 2011]); or (2) restripe the section of Valley Drive between 2nd Street and Horondo Street to make it two-way and direct all truck traffic to approach the Project Site from the South.

The impact of a change in truck traffic due to the proposed project on the health of the community is provided in Table 5-29.

Table 5-29 Traffic Assessment: Traffic safety

Health Determinant	Traffic safety
Potential Health Outcome	Potential increase in number of pedestrian, bicycle or other injuries
Pre-Mitigation Discussion	Without mitigation, there is potential negative impact associated with the introduction of truck trips in close proximity to sensitive receptors
EIR Mitigation	Traffic mitigation measures: (TR-1a through TR-1d)
Geographic Extent	Localized
Vulnerable Populations	Pedestrians and cyclists (children and the elderly)
Magnitude	High
Adaptability	Medium
Likelihood	Unlikely
Post-Mitigation Health Effect	No Substantial Effect
Comments or Additional Recommended Measures	None

Injury due to truck-traffic collision can occur because trucks are large, have reduced visibility due to their size and elevation, and there is no barrier between the sidewalk and the street on some roadways. Traffic injury can result in fatality or serious injury, especially when accidents involve pedestrians or bicyclists. Without EIR mitigation measures summarized above, it is possible that the introduction of truck trips uncommon with existing conditions in close proximity to sensitive receptors would present a risk to pedestrians and bicyclists. However, the project will only go forward with mitigation measures in place.

The extent of a potential health impact from the proposed Project with mitigation is '**localized'**. While truck routes extend throughout Hermosa Beach and adjacent communities during pipeline construction, the impact would be concentrated along Valley Dr., particularly at the intersection of Valley Dr. and 6th St. since nearly all project-related vehicles will be using this intersection and crossing over the sidewalk. Vulnerable populations were identified as '**pedestrians and cyclists, particularly those who are either young or elderly'**. The magnitude is **'high'** since just a single traffic accident can pose a major hazard to an individual's health. The adaptability is considered '**medium**' since those individuals that experience a disruption in safety may seek alternative routes to avoid increased truck traffic. The likelihood of increased accidents occurring from the proposed project is '**unlikely**' since the mitigation measures such as the addition of crossing guards and the reconfiguration of Valley Dr., in addition to the safety measures required by the CUP, will reduce the likelihood of injuries. Converting Valley Drive to a one-way thoroughfare would increase the separation distance between pedestrians and trucks traveling on Valley Drive, therefore alleviating some of the risk of injury to pedestrians and bicyclists along Valley Drive. Alternatively, converting Valley Drive between 2nd Street and Horondo Street to two-way means that all truck traffic would approach the Project Site from the South, therefore eliminating increased truck traffic on roadways North of the Project Site (i.e., Pier Avenue) that are more heavily trafficked by pedestrians. Overall, with safety measures in place, there is considered to be '**no substantial effect**' on traffic safety as a result of the proposed project. Therefore, no additional measures are recommended.

5.6.2 Active Transportation

5.6.2.1 Traffic and Active Transportation

Perceptions about traffic safety can also impact health by altering active physical transportation activities, including walking and biking. People who live in areas more conducive to walking and bicycling are more likely to use these forms of active transportation. Research has demonstrated that adults living in neighborhoods characterized by higher levels of traffic safety had increased odds of being active (Jongeneel-Grimen et al., 2013). An individual's perception of their environment may be just as important as the condition of the physical environment itself. A cross-sectional study in higher- and lower- income areas of St. Louis, Missouri and Savanah, Georgia found that active transportation was positively associated with perceived access to bike lanes (Hoehner, 2005). A comprehensive review of the literature found that the perceived risk of injury by motorized traffic due to traffic speed and volume impacts people's decisions to drive, walk, bicycle, or use public transportation (Jacobsen, 2009). Parental perceptions of safety are especially important for rates of walking and bicycling among children (Olvera, 2012). A survey conducted on a representative sample of the U.S. population inquired whether children walked or biked to school and sought to identify any barriers to walking or biking. Of the respondents, 40% reported that traffic danger was a barrier against walking or biking to school (CDC, 2002).

Findings from the literature suggest that perception of safety is an important mediator of the relationship between traffic safety and walking/bicycle trips. Perceived risk of injury may discourage walking and bicycling, which can directly impact health by decreasing physical activity levels. Physical inactivity is a major contributor to the steady rise in rates of obesity, diabetes, heart disease, stroke, and other chronic health conditions in the United States (CDC, 2011).

5.6.2.2 Current Conditions

Data on pedestrian/bicyclist counts and data on perceived safety of the streets in Hermosa are not available. However, Hermosa Beach is considered a pedestrian and bike-friendly city. Pedestrians, joggers, bicyclists, skateboarders are a typical sight at all times of day especially along Pier Avenue and near the beach. According to the South Bay Bicycle Master Plan, the City of Hermosa Beach has 1.8 miles of Class I bike path (bicycle-only paths along the beach), 0.5 miles of Class II bike paths (bicycle lanes) and 2.8 miles of Class III bike paths (shared road for motorist and bicyclists) for a total of 5.1 miles within the City (Alta, 2011). The South Bay Bicycle Master Plan seeks to further encourage bicyclists specifically by converting Valley and Ardmore to one-way streets with bike lanes (WLCI, 2011).

Children attending either of the two public elementary schools in Hermosa (Hermosa View Elementary and Hermosa Valley) arrive and leave via passenger car, walking, or bicycle. Hermosa View Elementary is located on the corner of 19th St. and Prospect Ave. (east of PCH) and Hermosa Valley School is located on Valley Dr. between 18th St. and Pier Ave. (west of PCH). Since 2011, Hermosa View Elementary has had a Walking School Bus (WSB) program led by the Beach Cities Health District (BCHD), as a means of encouraging healthy behavior and curbing childhood obesity. The WSB program allows children within a mile radius of school to meet up with classmates and BCHD-trained parent volunteers at designated “bus stops,” and safely walk to campus. WSB is between 7:50 and 8:15 am and “stops” at the following locations: Hollowell/Prospect, 6th St./Prospect, 9th St./Prospect, and 15th St./Prospect.

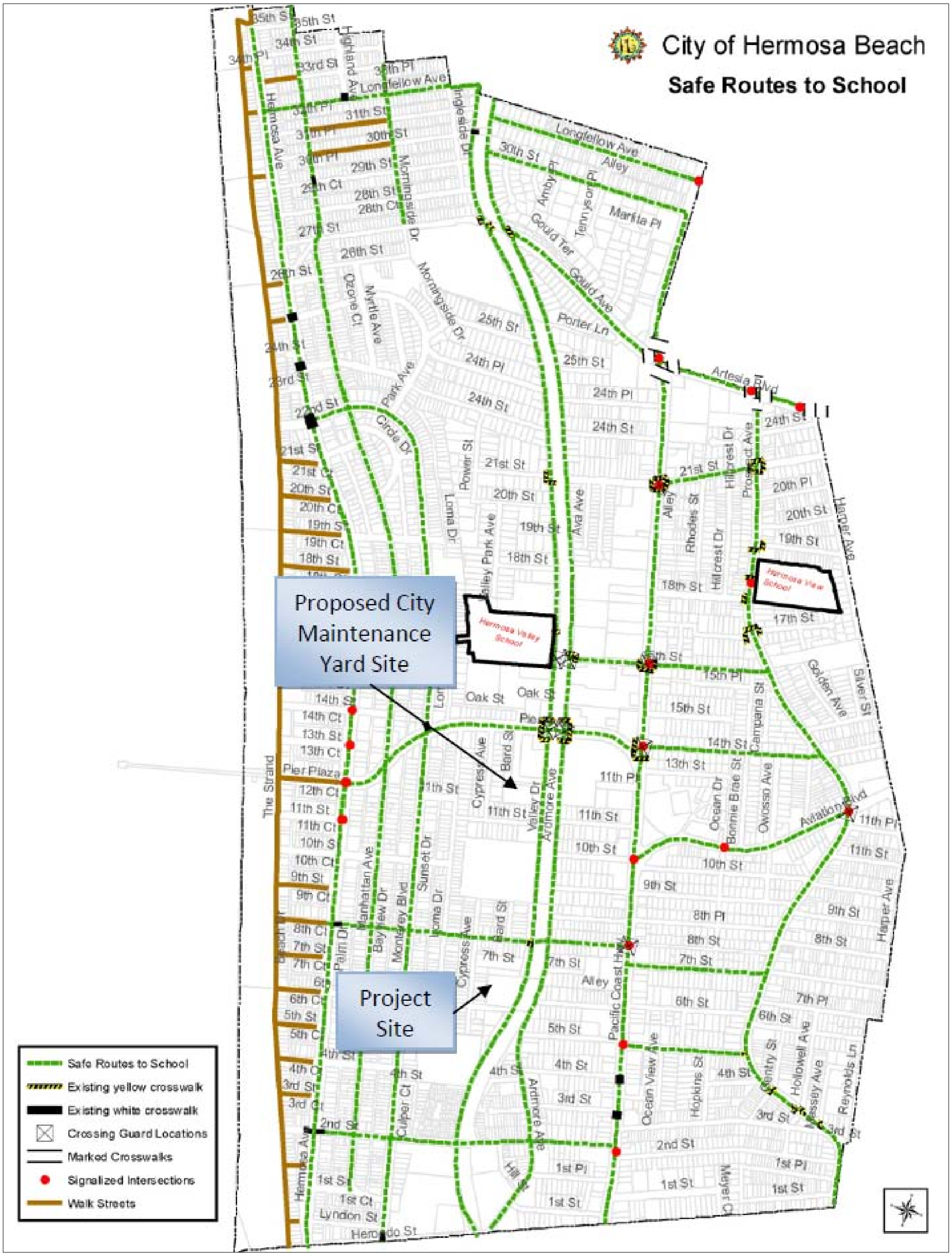

Figure 5-8 Safe Routes to School (MRS, 2014)

Additionally, Hermosa Beach City School District publishes a map showing all the safe routes to school, which includes Valley Drive in front of the Site and the Proposed City Maintenance Yard (Figure 5-8). It is important to note that there is no landscape buffer along most parts of Valley Drive, with pedestrian sidewalks located immediately adjacent to the road (Figure 5-9).

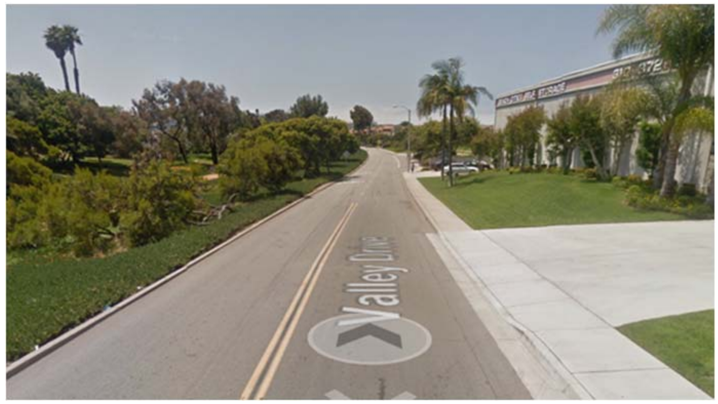

Figure 5-9 Pedestrian Sidewalk, Valley Dr./ 6th St. (google maps)

5.6.2.3 Project Impact

As discussed above, research has shown that perceived traffic safety and hazards can influence active transportation in a population. Accurately or not, community members may judge injury risk and change their behavior accordingly. Increased truck traffic, especially along Valley Dr., may make the adjacent sidewalk (including the school route) less walkable if parents, children, and other community members feel that their safety is compromised. Portions of Valley Dr. with no landscape buffer between the sidewalk and roadway may be particularly susceptible to decreased use by pedestrians and bicyclists.

The impact of a change in truck traffic due to the proposed project on the health of the community is provided in Table 5-30.

Table 5-30 Traffic Assessment: Perceived traffic hazards

Health Determinant	Perceived traffic hazards
Potential Health Outcome	Decrease in active transportation
Pre-Mitigation Discussion	Same as post-mitigation
EIR Mitigation	Traffic mitigation measures: (TR-1a through TR-1d)
Geographic Extent	Localized
Vulnerable Populations	Pedestrians and cyclists (children)
Magnitude	Medium
Adaptability	Medium
Likelihood	Unlikely
Post-Mitigation Health Effect	No substantial effect
Comments or Additional Recommended Measures	None

As discussed in Section 5.6.1.3, the EIR proposes a number of mitigation measures to alleviate potential traffic safety hazards. Those measures could also improve the perceived danger posed by increased truck traffic. For example, seeing increased crossing guard presence may influence the level of perceived risk to children walking to school. However, mitigation measures may or may not change people's perceived risk of injury from Project related traffic. Without a better understanding of current safety perceptions and their relation to active transport, it is not possible to distinguish between the pre-mitigated and post-mitigated health impact. The extent of a potential impact is '**localized'**. The impact would be concentrated where people perceive changes in traffic patterns, particularly at the intersection of Valley Dr. and 6th St. since nearly all project-related vehicles will be using this intersection and crossing over the sidewalk. Vulnerable populations were identified as '**pedestrians and cyclists, particularly children'**. The magnitude is **'medium'** since perceived risk of injury may discourage walking and bicycling and impact health by decreasing physical activity levels, but the impact is reversible and poses a minor hazard to health. The adaptability is considered '**medium**' since those individuals that experience a disruption in perception of safety may maintain physical activity levels by seeking alternative routes to avoid increased truck traffic. For example, children and adults can choose to use the Greenbelt path that runs parallel to the Valley Dr., which is separated from the street by a sizeable buffer, instead of the Valley Dr. sidewalk near the Project Site. The likelihood of perceived traffic safety hazards causing a decrease in active transportation due to the proposed Project is '**possible**' since negative traffic perceptions do not necessarily reflect actual traffic hazards, and therefore are impossible to completely mitigate. Overall, because the impact is localized and most community members should be able to adapt to the increased perception of traffic hazards by seeking alternative routes, there is considered to be '**no substantial effect'** on perceived traffic hazards resulting in decreased levels of active transportation due to the proposed Project. Therefore, no additional measures are recommended.

5.6.3 Summary and Conclusions

Increases in traffic volume are associated with increased risk of injury and death due to vehicle-vehicle, vehicle-pedestrian, and vehicle-bicycle collisions. Currently, fatalities resulting from motor vehicle collisions are very rare in the pedestrian and bike-friendly City of Hermosa Beach. A Traffic Impact Analysis (TIA) prepared by Arch Beach Consulting (2013) concluded that project-related traffic would not significantly impact the level of service on any of the studied roadway segments and therefore the EIR indicated that project-related traffic will not have a significant impact on traffic congestion. However, the introduction of truck traffic on roads not accustomed to large trucks could represent a safety hazard to bicyclists and pedestrians. Consequently, the EIR recommends additional mitigation including increased crossing guard presence at the Site, installation of warning signs and lights, ensuring that trucks are not too long, and reconfiguring Valley Dr. Overall, with safety measures in place, and because of the limited extent of increased traffic, traffic safety is not predicted to have a substantial health impact in the community.

The traffic assessment within the HIA concludes that, with implementation of the proposed EIR mitigation measures, there is no substantial effect on human health with respect to traffic safety and perceived traffic safety hazards.

Findings from the literature suggest that perception of safety is an important mediator of the relationship between traffic safety and active transportation, or walking/bicycle trips. Perceived risk of injury may discourage walking and bicycling, which can directly impact health by decreasing physical activity levels. Parental perception of safety is especially important for rates of walking and biking among children. Since the Project Site lies on a safe walk to school route, there is a possibility that perceived traffic hazards could result in decreased active transportation. However, the impact is limited to a portion of Valley Drive. and most community members should be able to adapt to the increased perception of traffic hazards by seeking alternative routes for walking and biking.

5.7 Community Livability

Community livability defines elements that make it desirable to live in a particular place. These can include environmental, social and economic elements. Hermosa Beach is a desirable community for many reasons including proximity to the beach, local bars and restaurants, ample community services, local climate, walkable neighborhoods, and quality housing. For the proposed Project, local residents voiced certain concerns they have regarding different aspects of community livability. A quality of life committee was formed as part of the Community Dialogue process, with the objective of facilitating communication with the City on a number of large decisions (including the proposed Project). The quality of life committee created a presentation (Appendix F) that was reviewed and discussed with the HIA Team in order to identify the following health determinants associated with community livability:

- Property Values;
- Community Resources:
    - Access to Recreational Resources and Green Space
    - Aesthetics and Visual Resources
    - Education Funding
- Social Cohesion; and,
- Political Involvement.

5.7.1 Property Values

5.7.1.1 Property Values and Health

Socio-economic status (SES) has long been established as an important population health risk factor (NCHS 2011). According to Coffee et al. (2013) *"SES is a complex, multidimensional concept that is typically represented using one or all of the 'triad' of indicators, education, income and occupation."* (Figure 5-10). In addition, housing characteristics (e.g., housing tenure, housing type, number of bedrooms, etc.) have also been used as a proxy.

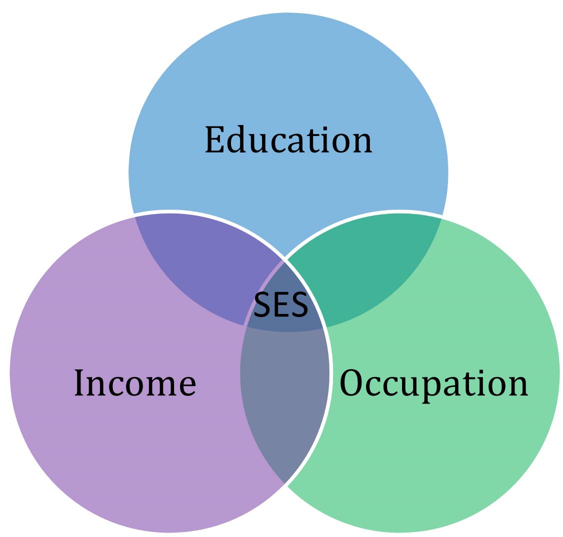

Figure 5-10 Common Indicators of Socio-Economic Status (SES)

Residential property is often the most valuable asset that an individual will own and therefore, it provides a useful estimate of socio-economic status. Property values are driven by a number of different factors including economic market changes, trends, and proximity to amenities such as reputable schools, green spaces and amenities. To illustrate the association between property characteristics and health measures, a recent study correlated higher residential property values with lower cardiovascular risk, lower obesity risk, reduced cholesterol scores and lower diabetes risk (Coffee et al., 2013). This association seems to hold true for Hermosa Beach since it is a city of economic prosperity and high levels of health and well-being overall. Although this correlation doesn't necessarily imply causation, it reflects the close ties between property value and socioeconomic status, which is an established indicator of health status (Adler and Ostrove, 1999).

Due to the inherent complexity around estimating SES, it stands to reason that any potential links between property values, SES and health must be carefully considered and evaluated. Since property values are peripherally linked to socioeconomic status, and socioeconomic status is indirectly associated with health status, drastic changes in property values that fundamentally change an individual's SES could potentially influence health. Although minor to moderate changes in property values will not likely result in direct physiological harm, they may lead to increased stress and anxiety.

5.7.1.2 Current Conditions

Since education, income and occupation are considered to be fundamental elements of socioeconomic status, they were evaluated as part of the baseline health assessment (Appendix E). With respect to education, Hermosa Beach residents are considered highly educated, with nearly 70% of residents having obtained a bachelor's degree or higher. This can be compared to LA County where less than 30% of residents have post-secondary education. Hermosa Beach residents are also considered to be more financially secure when compared to county and national averages. The median household income in 2012 was approximately $51,000 in the US (US Census 2012), $56,000 in LA County and $102,000 in Hermosa Beach. Therefore, residents of Hermosa Beach have an annual household income that is approximately double the rest of the country, including that of LA County.

Baseline conditions related to property values in Hermosa Beach are also considerably higher than average. The median value of owner-occupied homes in Hermosa Beach is $1,000,001. The median price of a new home in the US at the end of 2013 was $275,500 (US Census, 2014); therefore, the average house price in Hermosa Beach is >350% or 3.6 times higher than the national average. The homeownership rate in Hermosa Beach is slightly less than that of LA County (44.9% versus 47.8%), which is likely due to Hermosa's popularity as a beach tourist destination and an area highly attractive to both renters and leasers.

The Los Angeles County Department of Public Health (LACDPH) ranked 117 cities in LA County by economic hardship, using the following indicators: (1) crowded housing, (2) percent of persons living below the Federal poverty level, (3) unemployment, (4) percent of persons over age 25 without a high school education, (5) dependency (percentage of the population under 18 or over 64 years), and (6) per capita income. Based on 2005-2009 data for the indicators listed, LACDPH ranked Hermosa Beach number 1 out of 117 cities, that is, Hermosa Beach was determined to have the least level of economic hardship county-wide (LACDPH, 2103).

Since fluctuations in housing and land value can impact people's stress levels, the current reported stress levels of Hermosa Beach residents are also discussed in this section. The Beach Cities Health District (BCHD) conducted a survey of 1,332 residents in Hermosa Beach and surrounding communities, and found the overall well-being rating for residents of Hermosa Beach, Manhattan Beach, and Redondo Beach was higher than the California average and above the top tier of other cities. The survey found that 46% of the Beach Cities residents felt stressed for most of the day, a number that ranked their stress higher than most communities (176th out of 188 communities surveyed). Additionally, they were ranked 160th for anger and when asked if they had significant worries, 37% said they did, which ranked the Beach Cities 177th out of those 188 communities surveyed (Blue Zones, 2010). More than 90% of local residents said they had access to health care, health insurance and enough money for food, shelter and other basic needs. Two-thirds were found to be "thriving."

Overall, the baseline health assessment concluded that demographic indicators show that Hermosa Beach is not highly vulnerable to poor health outcomes traditionally associated with poverty, unemployment, and low educational attainment.

5.7.1.3 Project Impact

Like the HIA, the Cost Benefit Analysis (CBA) was conducted to provide additional information and analysis that is not required as part of the EIR under the CEQA. An evaluation of private property values was conducted as part of the CBA, including an analysis of properties in LA County in proximity to other existing and proposed oil wells (Kosmont, 2014). The CBA noted that "given the multitude of factors that influence buyer's decisions, and wide variation in individual calculus, the value or impairment in value of a particular attribute is extremely difficult to predict." Although many of the analyses were inconclusive, they identified case studies that had conducted similar evaluations. One case study called the 'Oil Well Lot Proximity Study' evaluated impacts of adjacency to oil wells on single-family homes and small income properties between 1980 and 2007 (Neustein and Matthews, 2011). This study found that "the discrimination against oil lot adjacent lots was found to be roughly 5% ($20 per square foot [PSF] at $500 PSF)." Overall, the CBA concluded that *"the Authors consider a 0-10% reduction in property values possible for properties proximate to the Project site."*

The complexities around property value fluctuations make it difficult to accurately evaluate the potential impact from one project; however, assuming that the CBA conclusion is correct in determining a 0-10% decrease, there is potential for this to increase stress levels among some residents. It is important to note that the Project Site is approximately 1.3 acres and is to be located on the current City Maintenance Yard property (already commercial/industrial land use). This is considered a relatively small area compared to other types of industrial developments. A study conducted in the Netherlands (de Vor and de Groot, 2009) evaluated the impact of industrial sites on residential property values. Their study included a wide range of industrial facilities and activities that are commonly located in proximity to people including landfills, waste sites, contaminated properties and manufacturing facilities. The authors conducted a review of the literature on this issue and found that impacts on property value tend to be relatively localized (decreasing with distance) and contain a high degree of variability (value impacts ranging from 0.24 % to as high as 20%). The review also illustrated the fact that all different types of development are considered ‘unwanted’ and that this issue is far from being unique to oil and gas developments. For example, studies have shown that air traffic, railway traffic and road traffic all have the potential to impact property values. The authors also noted that individual selectivity plays a role in property value impacts, as does the potential employment opportunity presented by industrial development. They concluded that:

> *“The results reveal that the distance to an industrial site has a statistically significant negative effect on the value of residential properties. However, the effect is largely localized within a relatively short distance from the nearest industrial site. Furthermore we obtained statistical evidence for substantial localized price differentials, which vary according to the size of an industrial site.”*

This highlights the fact that many different types of development are met with some level of concern over potential impacts on local property values. For most homeowners, future developments (whether industrial in nature or not) are beyond their immediate control, but so are many of the factors that influence property value fluctuations including interest rate changes, economic activities, government decisions, etc. However, in the case of Hermosa Beach the community has the ability to vote on whether or not to lift the ban on oil drilling, which is unique since most industrial developments are not approved at a community-level. For further discussion on political involvement, see Section 5.7.6.

Whether the potential decrease in property values is real or perceived, it may cause increased stress and anxiety among some residential and commercial property owners. It is important to identify that many property owners are in fact landlords who rent out their space. These individuals may or may not reside in the city itself and may or may not be dependent on rental income as their primary source of income. There is little to no publically available data to evaluate this aspect; however it is important to note that Hermosa Beach is among the wealthiest cities in LA County with a median annual household income over $100,000. Given the construction and operation of the proposed Project is not anticipated to significantly impact the average household income, education (in fact improvements via additional funding are likely), or occupation of most of Hermosa Beach residents, the Project will not drastically affect the socioeconomic status of the community. Since socioeconomic status has been linked to health status, this is a promising finding. However, given that 46% of the community self-identified as experiencing stress on a regular basis it is advisable for residents to engage in activities known to reduce stress in general.

The impact of a change in property values due to the proposed Project on the health of the community are provided in Table 5-31.

Table 5-31 Community Livability Assessment: Property Values

Health Determinant	Property Values
Potential Health Outcome	Potential increase in stress and anxiety
Pre-Mitigation Discussion	Not Applicable
EIR Mitigation	Not Applicable
Geographic Extent	Localized
Vulnerable Populations	Property owners
Magnitude	Medium
Adaptability	Medium
Likelihood	Possible
Post-Mitigation Health Effect	Negative
Comments or Additional Recommended Measures	E&B could consider evaluating housing prices for those in the immediate vicinity of the Project Site.

Since this aspect of community livability is related to the potential impact on property values rather than Project operations, the pre-mitigation discussion and EIR measures are considered '**not applicable**'. Based on findings in the literature, potential impacts on property values (and associated stress) are limited to a '**localized'** group of individuals who are located in closest proximity to the proposed Project site. The vulnerable populations identified for the property value impacts are **'property owners'**. The magnitude is classified as '**medium**' since the potential stress and anxiety is considered to be detectable, reversible and posing a minor to moderate hazard to health. Since it is anticipated that the stress experienced as a result of concern over property values is not physiologically different than other sources of stress, it is advisable that community members seek out and engage in activities intended to reduce stress. In identifying the adaptability as '**medium**', consideration was given to the fact that people are often able to adapt to changes in their environment and are able to cope with stressful situations, although they may require some support. The likelihood was defined as '**possible**' since there is potential for stress from property value fluctuations to occur on a regular basis. Overall, the potential health impact associated with an actual or perceived decrease in property values is classified as **negative**, due to potential increases in stress and anxiety.

To reduce any potential stress or anxiety that local property owners may experience as a result of the proposed Project the Applicant could consider having a property value analysis conducted prior to construction, during construction and one year into operations. This analysis would need to take into consideration local, regional and national fluctuations in property values and compare and contrast the data against potential changes in the value of properties located near the proposed Project. This would help to document any observed fluctuations in property values and show whether they remain within expected levels consistent with other similar communities. Additionally, the Applicant could consider stabilizing "proven" impacts to property values, perhaps through an arbitrator process.

During preparation of this report, a draft development agreement (City of Hermosa Beach, 2014) was released that contains some consideration of stabilizing property values. The draft agreement states that *"similar to Huntington beach, E&B proposed setting up and funding an* *account that would stabilize proven impacts to property values for 5 years (during drilling) for properties in close proximity to the project. E&B clarified that the timeframe was undecided at this time. It further clarified that the residents would need to voluntarily apply for this program."* (City of Hermosa Beach, 2014). This proposal is similar to the additional mitigation recommended in the HIA to further reduce potential impacts from stress and anxiety over property value fluctuations.

5.7.2 Community Resources: Access to Recreational Resources and Green Space

5.7.2.1 Access to Recreational Resources and Green Space and Health

Community resources that encourage good nutrition and physical activity are instrumental in improving quality of life. For example, community garden programs funded by California Healthy Cities and Communities have provided opportunities for good nutrition and physical activity education. In Oceanside, two community gardens were established and 228 residents receive nutrition education; of these residents, 86% reported a desire to improve eating habits (Twiss et al., 2003). Furthermore, regular physical activity has been shown to have a multitude of positive health implications including (CDC, 2014):

- Weight control;
- Reducing the risk of cardiovascular disease;
- Reducing the risk of type 2 diabetes and metabolic syndrome;
- Reducing the risk of some cancers;
- Strengthening bones and muscles;
- Improving mental health and mood; and,
- Increasing the chance of living longer.

A large number of studies show that access to outdoor green space benefits the overall physical and mental well-being of communities; however, the mechanism for this beneficial relationship is unclear. Green spaces can allow people to reduce stress by connecting with natural environment, provide an opportunity for social interaction, and encourage physical activity. However, a recent study found that the availability of green space is not directly associated with levels of physical activity (Ord et al., 2013). Therefore, both physical and psychological mechanisms are likely factors contributing to the association between green space and health. In a large study (Asrell-Burt et al., 2013) of more than 260,000 middle to older-age adults, it was found that residents in the neighborhoods with the most green space were at lower risk of psychological distress (Kessler scores of 22+) and were less sedentary (OR=0.8, 95% CI: 0.77, 0.87) than residents in neighborhoods with the least green space (OR=0.83, 95% CI: 0.76, 0.92). Additionally, access to green space benefited mental health among more physically active people, but did not appear to benefit the least physically active people (Astell-Burt, 2013). In a longitudinal study of British households, moving to urban areas with more green space was associated with sustained mental health improvements for three consecutive years (Alcock et al. 2014); however, this study did not explore the interaction with level of physical activity.

Another study measuring the relationship between coastal proximity and health and well-being found that living near the coast was associated with better general health and mental health (White et al., 2013). There are a number of factors that determine the accessibility of green space including distance between green space to where people live, walkability, safety, physical appearance, and hours of operation and/or cost (Garcia, 2011).

5.7.2.2 Current Conditions

Hermosa Beach residents have access to community “green space”, such as parks, and recreational resources readily available to the community. For example, there are three large fields, located at Valley Park, Clark Stadium and South Park, which are home to several youth and adult sport leagues. Hermosa also has tennis courts, a skateboard park, and over 70 beach volleyball courts available to the public according to the City website. Based on feedback from the community, one of the most valued green spaces in Hermosa (other than the beach) is the Greenbelt, a popular greenery-lined 3.5 mile trail with a wood chip path used for running and walking. At 6th and Valley, the Greenbelt passes within 55 feet of the proposed Project Site.

In total, Hermosa Beach has over 20 parks or green spaces that amount to approximately 138 acres (Figure 5-11), including the Hermosa City Beach (Green Info Network, 2014). Based on a total population of 19,605, there are approximately 7 acres of green space per 1,000 residents. This is much higher than most inner city assembly districts that have less than 1 acre of green space per 1,000 residents. Communities with the least access to green space tend to be those with lower income levels and more people of non-white race/ethnic backgrounds. Demographic indicators show that Hermosa Beach is not highly vulnerable to poor health outcomes traditionally associated with poverty, unemployment, and low educational attainment. The Los Angeles County Department of Public Health ranked Hermosa Beach number 1 out of 117 cities to have the least level of economic hardship county-wide, which has far-reaching effects on access to community resources including green space.

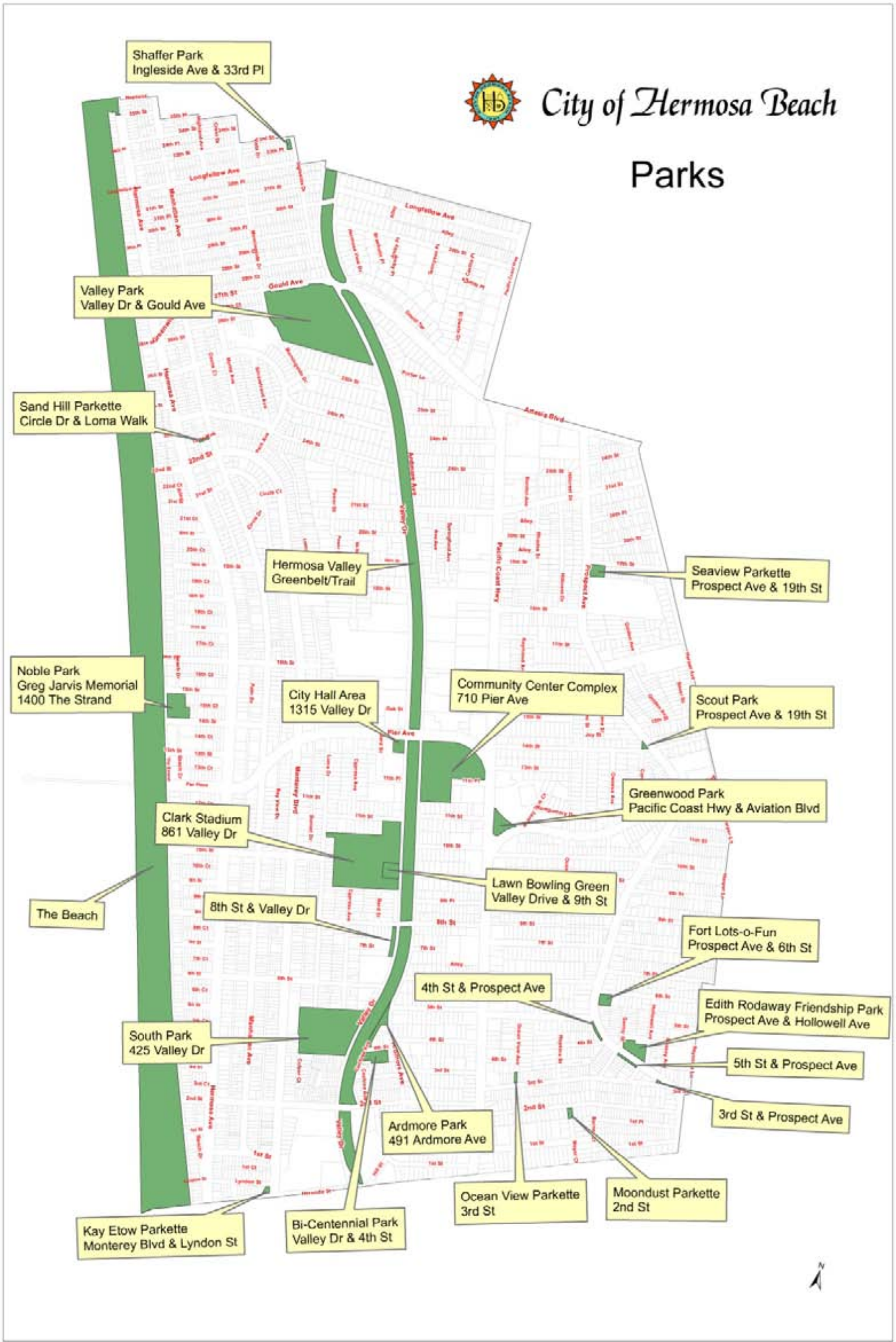

Figure 5-11 Parks currently located throughout the City of Hermosa Beach (http://www.hermosabch.org/modules/showdocument.aspx?documentid=437)

The City of Hermosa Beach and its community members are exceptionally committed to an outdoor lifestyle and making their environment a healthy place to live. In 2010, the Beach Cities Health District joined the Blue Zones Project™ initiative to create a beach cities community that is healthier and more walkable, bikeable, and socially engaged. Blue Zones uses the Gallup-Healthways Well Being Index™ to benchmark well-being and measure progress (Blue Zones 2010). In addition, the Beach Cities Health District (BCHD) seeks to promote health and prevent diseases in the communities of Hermosa Beach, Manhattan Beach and Redondo Beach. According to the 2013 BCHD report, three out of five beach cities adults (60%) meet the federal guideline for physical activity, which is 150 minutes of moderate-intensity exercise per week. This is commendable considering that nationally less than half (48%) of adults meet the standards for physical fitness (US DHHS, 2008).

5.7.2.3 Project Impact

Hermosa is well-known for supporting an active lifestyle including a wealth of beach/park activities (i.e., surfing, volleyball, skating and skateboarding, jogging, and bicycling). Therefore, Hermosa Beach residents may be interested in using City revenues from the Project to further develop additional green spaces to further improve physical and psychological health. The Community Dialogue quality of life working committee identified the desire to increase children's beach play areas by adding swings and slides. It is possible that the proposed Project could generate revenue to support improvements of existing parks and development of additional recreational areas.

The Cost Benefit Analysis found that the majority of oil and gas revenue would come from the Tidelands fund, which could be used to fund beach preservation. The amount of Tidelands revenue and the proportion of the revenue available to improve green spaces outside of the beach and coastal areas are uncertain. However, the CBA estimates that over the 35 year life of the Project the City would realize net revenues of approximately $118 million to $270 million (in 2014 dollars), of which an estimated 37% to 42% would accrue to the General Fund (i.e., not restricted to the Tideland fund) that the City could use to fund various community improvements (Kosmont, 2014).

While revenue from the proposed Project is predicted to have an overall community-wide positive impact on recreation and green space, Project activities occurring in close proximity to existing parks should also be considered. The Project Site is currently the City Maintenance Yard and there will be no impact to the amount of existing green space in Hermosa. However, the Project Site is next to the Greenbelt, near other parks, and near walking and biking travel routes. Disturbances, particularly related to construction activities in Phases 1 and 2 could temporarily decrease ready access to recreational resources or the quality of the recreational experience.

The impact on community livability recreational resources and green space due to the proposed Project is provided in Table 5-32.

Table 5-32 Community Livability Assessment: Access to Recreational Resources and Green Space

Health Determinant	Access to Recreational Resources and Green Space
Potential Health Outcome	Change in physical activity levels, which can lead to other health issues
Pre-Mitigation Discussion	Not Applicable
EIR Mitigation	Not Applicable
Geographic Extent	Community
Vulnerable Populations	None
Magnitude	Medium
Adaptability	High
Likelihood	Possible
Post-Mitigation Health Effect	Positive
Comments or Additional Recommended Measures	To maximize potential health benefits from access to green space and recreational activities the City should form a community advisory group on how to spend revenue.

Since there will be no impact to the amount of existing green space in Hermosa Beach, there are no EIR mitigation measures, and a pre-mitigation discussion is not applicable. The geographic extent is **'community'** since existing green spaces (i.e., Cypress/Clark Park and Clark Stadium, South Park and the Greenbelt) will remain intact, and revenues may be used across the City to improve recreation and green space. There were no vulnerable populations identified for access to recreational resources and green space; therefore, it was classified as **'none'**. The magnitude is classified as **'medium'** since overall the impact (if any) could improve access to recreational and green space and pose a minor to moderate benefit to health. Additionally, adaptability is considered to be **'high'** since the people will be able to adapt to the change with ease and maintain a pre-Project level of health. Finally, the likelihood of health impacts from access to green space is '**possible'** since it is anticipated that at least some portion of the City revenue from the Project would be used to improve or expand existing tideland recreational or green space conditions. Though there is a temporary local adverse impact to recreational resources due to disturbances to parks and recreation near the Project Site, overall, the post-mitigation effect is **'positive'** with respect to health and access to green space for the proposed Project. It is recommended that a community advisory group be formed to aid the City in deciding priority for recreational / green space funding.

5.7.3 Community Resources: Aesthetics and Visual Resources

5.7.3.1 Aesthetics and Health

Aesthetic value is a complex concept that is highly subjective. There is a high degree of individual variability when it comes to the visual impact and/or aesthetic value of an object or a place. There are several factors involved in whether an individual finds an object or place visually appealing, including attitude and preconceived notions. Places that are identified as having a high aesthetic quality have been associated with increased contemplation, personal reflection, enjoyment, relaxation. An increasing number of studies have considered the impact of aesthetics, with a growing consensus general well-being can be improved as a result of contact with environments considered to have high aesthetic value (Galindo and Rodriguez, 2000; Brady, 2006; Philipp, 2001).

The way that aesthetic value is assessed is an important component of evaluating potential links to human health and well-being. There are a number of terms (MRS, 2014) that can be used to objectively describe aesthetics in terms of its elements, character and quality (Figure 5-13).

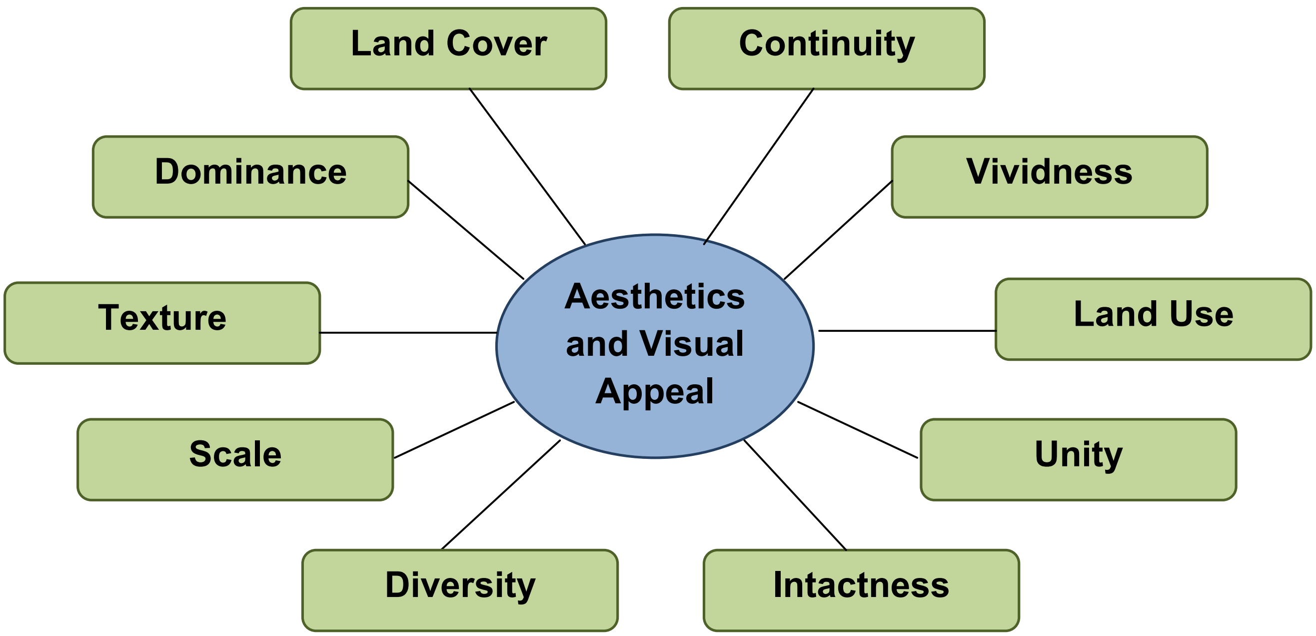

Figure 5-12 Typical descriptors of aesthetic value as an indication of visual appeal

In a study conducted by Galindo and Rodriguez (2000) a series of photographs (mixed type landscapes and cityscapes) were provided to test subjects who were asked to rate the photographs based on their assessment of its aesthetic value. Although there was considerable difference among individual selections, photographs that were ranked the highest in terms of aesthetic appeal were identified as having several common factors including:

- Presence of vegetation;
- Openness;
- Feelings of tranquility;
- Cleanliness;
- Familiarity of surroundings; and,
- Absence of traffic/noise/pollution.

Conversely, photographs that were given poor rankings on the basis of aesthetic value lacked the above components in addition to 'deterioration and neglect' as well as 'feelings of distress'.

It is interesting to note that although the presence of buildings and roads were on the list of reasons to provide a lower aesthetic score, they were not considered as important as the presence of vegetation (Galindo and Rodriguez, 2000). This provides insight into potential mitigation options for future development in urban areas.

Another article, published by Brady (2006), explored the potential association between aesthetic environments and well-being. Although the author tends to focus on the natural environment, it is acknowledged that there are also benefits from landscapes that provide vital services or leisure activities. The author points to a number of studies that "support the long-standing nature tranquility hypothesis, which recognizes the benefits of nature for humans and has had an important role in urban planning and landscape design, including the work of Frederick Law Olmstead, who designed Central Park and Prospect Park in New York, among other green urban spaces" (Brady, 2006). The author concludes that the benefits of both 'wild' and 'cultivated' nature are clear and that engaging in leisure activities such as gardening or spending time outdoors can positively impact feelings of tranquility and overall well-being.

Changes in the aesthetics of a local environment have the potential to cause annoyance and stress, particularly if the change is viewed as intrusive or unwanted. Additionally, something that is considered necessary and aesthetically pleasing to one person may be unappealing to another. An example of this is the public's reaction to wind turbines – some individuals see them as beneficial and/or beautiful, while others consider them ugly intrusions on the natural landscape (Pedersen and Larsman, 2008). It has been demonstrated that people who have a negative attitude toward an environmental change are much more likely to experience annoyance and stress than those who see the change as positive. Therefore, any potential impacts resulting from a change in the local landscape aesthetics are expected to be related to visual cue and attitude rather than to any physiological change.

5.7.3.2 Current Conditions

As part of the EIR, a visual impact analysis was conducted to determine the potential aesthetic impacts associated with the proposed Project, including an evaluation of the existing (baseline) visual character and quality of the area. Part of the process of evaluating existing conditions, included identification of several Key Observation Points (KOP), which were public locations selected where viewer exposure and sensitivity are both high. The following KOPs were identified for evaluating aesthetics and visual resources in the areas surrounding the proposed Project:

Views from/near public roads which serve as a primary or secondary access to residential subdivision areas or recreation areas:

- Pacific Coast Hwy 1 (Primary); KOP 12;
- Hermosa Ave (Primary); KOP 9;
- Pier Ave (Primary); KOP 3 and 4;
- Valley Drive (Primary); KOP 5, 15, 16;
- 6th Street (Secondary); KOP 10, 13, 14 and 19;

- 8th Street (Secondary); KOP 16, 17, and 18;

Views from Recreation Areas:

- Hermosa Valley Greenbelt (Veterans Parkway); KOP 2, 15 and 20
- Ardmore Park; KOP 20
- Civic Center; KOP 5
- Community Center (Tennis Court Access); KOP 1
- South Park; KOP 11
- The Strand; KOP 8
- Hermosa Beach; KOP 7
- Hermosa Beach Pier; KOP 6

The visual resources in the vicinity of each major project component were evaluated in the EIR based on different landscape types or units. A landscape type/unit was defined as "an area of landform plus land cover forming a distinct, homogenous component of a landscape, differentiated from other areas by its degree of slope and pattern of land cover" (MRS, 2014). The two landscape units for the proposed Project are 1.) developed/roaded and 2.) open space/park.

The EIR evaluated baseline aesthetics and visual resources at two distinct areas associated with Project activities: Project Site and Pipeline.

Project Site:
The proposed Project Site is located in a densely developed area. According to the EIR, the Site is immediately surrounded by light manufacturing and open space land uses. One- and Two-family residences and open space borders the light manufacturing district. The built environment is comprised of primarily one to three-story structures with a relatively high degree of architectural variety and character. Development of individual parcels has typically been maximized making buildings the dominant physical/visual feature on most parcels. Planted landscape features have been integrated where feasible to complement and enhance the built environment. City streets, parks, the Veterans Parkway (Hermosa Valley Greenbelt), and public beach provide the public network that links and provides physical and visual access to the built environment (MRS, 2014)

The Pipeline:
The proposed pipeline would run through the cities of Hermosa Beach, Redondo Beach, and Torrance, within existing street and utility rights of way. The views along the pipeline route are consistent with those of a large roadway and include expansive areas of pavement, areas of streetscape enhancement, landscaping, street lighting and traffic signals. The utility right of way includes large transmission towers, areas of undeveloped grassland (Metering Station site), an entry monument for the City of Redondo Beach, a container plant nursery and a dog park (Dominguez Park) (MRS, 2014).

5.7.3.3 Project Impact

The potential for aesthetic impacts examined in the HIA include two major components of the Project:

1. The proposed Project (Phase 1-4); and,
2. The Pipelines.

Both could significantly alter the existing character and quality of the visual environment.

Aesthetic Regulations:

Various regulations and guidelines are in place for aesthetics, visual resources, vistas, light and glare that relate to the development of the Proposed Project. These include the California Coastal Act, City of Hermosa Beach General Plan, City of Redondo Beach General Plan, City of Torrance General Plan, and local planning and zoning ordinances. The following excerpts have been taken from the EIR and focus on those aspects of the regulations/guidelines that are intended to address visual impact and the aesthetic environment (MRS, 2014).

California Coastal Act (Scenic and Visual Qualities)

The scenic and visual qualities of coastal areas shall be considered and protected as a resource of public importance. Permitted development shall be sited and designed to protect views to and along the ocean and scenic coastal areas, to minimize the alteration of natural land forms, to be visually compatible with the character of surrounding areas, and, where feasible, to restore and enhance visual quality in visually degraded areas.

City of Hermosa Beach General Plan

The City of Hermosa Beach General Plan stipulates that introduction of massive land uses such as large buildings or new transportation corridors should be carefully evaluated. The Plan is concerned with abrupt changes in scale and form resulting in a land use overwhelming another. But it suggests that this visual shock can be lessened by generous landscaping and limiting the apparent size of buildings and parking lots near the boundary.

City of Hermosa Beach Municipal Code

The Municipal Code identifies certain requirements for building height and landscaping, which could affect visual quality of the Project Site and surrounding area. Manufacturing and commercial facilities are required to ensure that the appearance and effects are harmonious with the character of the area which they are located. Additionally, building height is restricted to 35 feet with a maximum of two-stories. Oil and gas operations are an exception and may exceed this height for a temporary period of time, which requires approval of a conditional use permit (MRS, 2014). Finally, all yard or open areas must be attractively landscaped and permanently irrigated.

Local Coastal Plan

It requires local coastal communities to develop plans for the preservation, enhancement and access to their coastal zone areas. The City of Hermosa Beach developed their Local Coastal Plan in 1981. The plan states "that the City should restrict building height to protect overview and viewshed qualities and to preserve the City's' existing low-rise profile".

All Project Phases:

Evaluation of aesthetic and visual resource impacts can be subjective in nature, and therefore requires that an objective methodology be established (MRS, 2014). The process used in the EIR was adapted from the guidelines used by the Federal Highway Administration for assessment of visual impacts. Impact intensity was established based on evaluating the baseline environmental setting and visual conditions against those depicted in the photo simulations.

Based on the results of the EIR visual assessment, the majority of Project-related activities (including pipeline construction) that have the potential to impact the aesthetics of the local community would be sufficiently diminished by existing operational design features and, where applicable, with additional mitigation measures (MRS, 2014). The exception to this is the presence of the electric and workover drill rigs that would be on the Project Site for a portion of Phase 2 and Phase 4. For this reason, it is not anticipated that visual impact from project-related activities, other than the presence of the drill rigs, will result in substantial negative impacts on health. A closer assessment of potential impacts resulting from aesthetics associated with drilling activities during Phase 2 and Phase 4 is provided below.

Presence of the Electric Drill Rig (Phase 2 and 4):

The 87-foot electric drill rig with three-sided acoustical shield would be installed at the Project Site at the beginning of Phase 2 (MRS, 2014). The presence of the rig on-site during this phase is expected to last approximately five months (four months drilling with two-week setup and two week take down). The rig would introduce a visually dominant vertical feature that is distinct in form, mass, height, material and character from structures in the viewshed of locations which are considered to have high sensitivity. For the fivemonths that it is up during this phase, the rig would break the skyline and become a dominant focal point (MRS, 2014).

The 32-foot sound wall constructed at the end of Phase 3 is proposed to remain on site during the first 2.5 years of Phase 4. The presence of the block wall would help to divide the mass of the sound attenuation wall, however the overall form, scale and lack of visual articulation would be uncharacteristic of the surrounding environment. Over time the surrounding landscape would mature and its capacity to soften the impact of the block retaining wall would increase. At the conclusion of drilling, the 32-foot sound wall and electric drilling rig are proposed to be removed from the site. Impacts associated with the electrical drill rig are similar for Phase 4, with an increase in duration to 2.5 years. The period with the drill rig onsite would produce substantial degradation of the existing visual character and would be a significant impact (MRS, 2014).

During periods of Phase 4, the workover rig (110 feet) could be present on site for up to 90 days per year. The structure of the workover drill rig introduces a focal element of industrial character into viewsheds of primarily residential and light industrial land use. Similar to the electric drill rig, this visual element would extend higher than other structures in the surrounding area and would provide a focal point against the skyline. It is possible that the workover rig could be set up at the Project Site up to 15 times per year. Since these operations have the potential to occur periodically throughout the year, this introduces the possibility for collective recurring visual impacts over the 30-35 year length of Phase 4 (MRS, 2014).

Based on the aesthetics assessment conducted as part of the EIR, the following mitigation measures are proposed to reduce and/or eliminate potential impacts to the local cityscape (AE-1a to AE-1b; AE-2a to AE-2d; AE3a to AE-3c) (MRS, 2014):

- Material choice of electrical drill rig acoustical shroud shall be of neutral sky color which is selected for its ability to reduce visual impact.
- The sound attenuation wall shall be replaced by a permanent wall with design features installed at the end of Phase 3. The intent is to provide stability of views and opportunities for positive visual elements that partially mitigate the visual presence of the walls from the Hermosa Greenbelt and other sensitive views in the immediate Project vicinity. Landscape design shall be allowed to be adjusted to respond to façade articulations, though quantities and densities shall be maintained.
- Design of the sound attenuation wall exterior façade shall be required to include design articulations that are complementary to the character, scale, and quality of the surrounding environment.
- Planting area growth medium shall be capable of supporting the long term health and growth of the landscape design.
- Vine plantings where used shall meet the following conditions: 1) be self-attaching or structure supported; 2) have demonstrated success in the City; 3) be planted at a density to achieve full coverage at maturity; 4) be planted at a minimum 5 gallon size; and 5) be required on the visible portion of the west wall at the temporary parking facility.
- All trees shall be required to be a minimum of 20' in height at installation and meet the American Standard for Nursery Stock.
- Pipeline alignments and valve box locations shall be designed to avoid the removal or modification of trees, hedgerows, and/or large shrubs to the extent feasible.
- If landscaped areas, streetscapes, plazas and/or parklands are required to be temporarily disturbed, they shall be restored to their previous condition following completion of construction. Avoidance of disturbance shall be the preferred option, especially where landscape elements act to screen views (hedges, large shrubs, etc) or where they act as community gateways (Redondo Beach at Hwy-1).
- Block color/s selection and pattern (if applicable) shall be complementary to adjacent buildings. A buffer of shrubs and vines shall be planted to match the existing character and quality of the adjacent properties.

Following the implementation of mitigation measures, visual impact and aesthetics would be significantly improved for activities associated with Phase 1-4. However, the impacts of the proposed Project while the drill rigs are on site are still considered to 'substantially degrade the visual environment' (MRS, 2014). Due to the height of the electric and workover drill rigs, there would be a noticeable change in the overall skyline that would be more prominent at locations closer to the Project Site but would be visible from many different parts of the community. Although the proposed mitigation to select a 'neutral sky color' for the electric drill rig drastically improves the visual impact of the structure by decreasing its prominence against the skyline (Figure 5-14 and 5-15), it is still considered outside of the typical character of the area. Consequently, the presence of the drill rig may influence individual levels of annoyance and stress associated with the local environmental change. Visual cue and attitude have been found to be highly associated with levels of annoyance from different types of environmental change. For example, studies conducted on wind turbine developments have found that visual cue and attitude were found to be more highly correlated with annoyance levels from wind turbine installations than from noise or other potential emissions (Bakker et al., 2012; Janssen et al., 2011; Pedersen and Larsman, 2008). Although the presence of the drill rigs will have a negative impact on the local scenery, and may contribute to increased annoyance and stress in some individuals, it is not anticipated to pose a serious health effects.

View 7: Existing Conditions

View 7: During Phase 2 with Drill Rig at Well 2

Figure 5-13 Key Observation Point (KOP) 7: Existing and During Phase 2 and 4 with Drill Rig (MRS, 2014)


View 18: Existing Conditions


View 18: During Phase 2 with Drill Rig at Well 4

Figure 5-14 Key Observation Point (KOP) 18: Existing and During Phase 2 and 4 with Drill Rig (MRS, 2014)

The impact of change in aesthetics and visual resources due to the proposed Project on the health of the community is provided in Table 5-33.

Table 5-33 Community Livability Assessment: Aesthetics and Visual Resources

Health Determinant	Aesthetics and visual resources
Potential Health Outcome	Annoyance and stress from negative perceptions and anxiety over project aesthetics
Pre-Mitigation Discussion	Potential for increased annoyance and stress as a result of Project implementation (all phases) without mitigation
EIR Mitigation	Aesthetic and visual mitigation measures: AE-1a to AE-1b; AE-2a to AE-2d; AE3a to AE-3c
Geographic Extent	Community
Vulnerable Populations	None
Magnitude	Medium
Adaptability	Medium
Likelihood	Possible
Post-Mitigation Health Effect	Negative
Comments or Additional Recommended Measures	The overall impact is negative based on the aesthetic environmental change leading to increased levels of annoyance and stress in some individuals.

The pre-mitigation impacts of the proposed Project on the aesthetics around the project area are considered negative for all Phases. The EIR has identified design features and additional mitigation measures (building requirements, stylizing, and landscaping) that will significantly improve the visual impact of the project overall. The geographic extent of changes in aesthetics and visual resources is classified as **'community'** since the presence of the drill rigs on the Project Site will be visible outside of the immediate area. There were no vulnerable populations identified for aesthetics and visual resources; therefore, it was classified as **'none'**. The magnitude of the aesthetic changes is classified as **'medium'** since the extent of the impact is detectable, it is reversible, and poses a minor hazard to health. Adaptability to this type of environmental change is **'medium'** given that not all individuals will adapt to the change (i.e., modified landscape) with ease; this is true regardless of the proposed EIR mitigation measures and their ability to substantially reduce negative visual impacts. The likelihood is **'possible'** since there is potential for the impact to occur on a regular basis due to the presence of the drill rigs during Phase 2 and 4; however, they are not permanent fixtures. Overall, there is a **'negative'** impact resulting from the aesthetics associated with presence of the drill rigs and their alteration of the existing landscape. The result of this impact is an increase in annoyance and stress for some individuals. No additional recommendations have been made.

5.7.4 Community Resources: Education Funding

5.7.4.1 Education and Health

Education was identified as a community resource that residents consider important to overall quality of life. Not only does education contribute to economic measures of success (e.g. income, employment, occupation), but it has also been shown to promote social well-being indicators including increased civic engagement, reduced crime and increased social and emotional skills (OECD, 2010). Some of the major concluding statements made in the OECD report relate specifically to the relationship between education and overall health and well-being:

- "A large body of literature suggests that education is strongly associated with a variety of social outcomes, such as better health, stronger civic and social engagement, and reduced crime. A smaller number of studies further suggest that education has a positive effect on most of these social outcomes. More importantly, from a policy perspective, education has been shown to be a relatively cost-effective means of improving health and reducing crime"

- "Education helps individuals make informed and competent decisions by providing information, improving their cognitive skills and strengthening their socio-emotional capabilities, such as resilience, self-efficacy and social skills. As such, education can help individuals follow healthier lifestyles, manage illness, increase their interest in political issues…and offer an ideal environment for children to develop healthy habits and participatory attitudes."

5.7.4.2 Current Conditions

The Hermosa Beach City Elementary School district is of a much higher quality than the state average and is ranked in the top 4% nationwide (US News, 2013). Only 2% of Hermosa Beach residents have less than a high school degree, whereas >19% of California residents do not graduate high school (US Census, 2009). According to the Community Dialogue committee on quality of life, parents and teachers work in a collaborative environment that is supportive of students, and the community is actively involved in major fundraisers to assist and promote the success of its schools (see Appendix F).

The Hermosa Beach Education Foundation (HBEF) is a 100% volunteer organization that raises money to support student programs. In 2012, HBEF contributed a total of $1,290,038 to benefit all grade levels in Hermosa Beach City School District. These private donations go towards funding programs like science labs, libraries and elective classes like journalism, drama, technology and art. Looking forward, residents have indicated that they would like to continue to work with the local school district in order to maintain and further improve the quality of education.

Additionally, in order to support after-school recreational programs, the City of Hermosa Beach expanded its Positive Active Recreation for Kids (PARK) program that focuses on crafts and sports.

5.7.4.3 Project Impact

The proposed Project is anticipated to influence educational funding by providing the local school district with an annual monetary contribution (for the 35 year life of the Project), as contractually required under the lease. Additional school district funding would further enhance education programs in Hermosa Beach, and therefore improve the social and economic health outcomes among schoolchildren throughout the community.

With respect to potential revenues for the Hermosa Beach School District, based on production estimates completed as part of the CBA, it was estimated that the school district would receive net revenues of approximately $1.2-3.2 million, over the 35 year life of the Project (Kosmont 2014). Since the annual amount of School District funding from the proposed Project depends on the amount of oil produced, the Cost Benefit Analysis estimates a range that Hermosa Beach schools may receive per year. Based on the CBA Expected case the School District would receive a minimum of $10,000 per year and a maximum of $130,000 the year of peak production (average of approximately $52,000 per year). Whereas, based on the Applicant's production estimates, the School District would receive a minimum of $10,000 per year and a maximum of $360,000 the year of peak production (an average of approximately $112,000 per year) (Kosmont 2014). This average annual contribution to the Hermosa Beach City School District would increase private funding between 4% (based on average CBA Expected) and 9% (based on average Applicant estimates). Although this contribution is modest compared to the amount of money raised by the HBEF, it is available to be used at the discretion of the district and will facilitate continued provision of top quality education in Hermosa Beach for decades.

The impact of additional education funding due to the proposed Project on the health of the community are provided in Table 5-34.

Table 5-34 Community Livability Assessment: Education Funding

Health Determinant	Education Funding
Potential Health Outcome	Increased resources and funding for education can indirectly lead to a more positive health status
Pre-Mitigation Discussion	Not Applicable
EIR Mitigation	Not Applicable
Geographic Extent	Community
Vulnerable Populations	Schoolchildren
Magnitude	Medium
Adaptability	High
Likelihood	Probable
Post-Mitigation Health Effect	Positive
Comments or Additional Recommended Measures	None

Educational funding that is to be provided to the local school district is related to Project production; however, there are no construction or operational issues that would require mitigation in relation to this determinant. Therefore, a discussion of pre-mitigation impacts and EIR measures is 'not applicable'. The geographic extent of impacts are classified as '**community'** since the funding is being provided to the district and is not assigned to a particular school, subject or grade-level. The vulnerable populations identified for education funding are **'schoolchildren'**. The magnitude is classified as '**medium**' since the impact is detectable and poses a minor to moderate benefit to health. This is based on findings in the literature that support education as a cost-effective method of improving health (OECD, 2010). Adaptability is considered to be '**high**' since the funding will become a part of the regular annual budget for the duration of the Project and the community will be able to maintain (if not improve) their pre-Project level of health. Further, the likelihood of prolonged beneficial health impacts brought on by increased educational funding are anticipated to the '**probable**' since the impacts are expected to persist over time and there is an established link between education, and present/future health and well-being indicators. Overall, the post-mitigation health effect of increased funding for education in Hermosa Beach is expected to be '**positive**'. Therefore, based on the assessment, no additional measures are recommended.

During preparation of this report, a draft development agreement (City of Hermosa Beach, 2014) was released that contains some consideration of supplemental education funding. The draft agreement states that *"E&B proposed additional funds for the schools to be provided by way of a separate agreement with the Education Foundation or other non-profit organization "* (City of Hermosa Beach, 2014). The HIA has identified a positive effect resulting from increased education funding and any additional increase (i.e., through a supplemental funding agreement) would further enhance this potential benefit.

5.7.5 Social Cohesion

5.7.5.1 Social Cohesion and Health

Social cohesion is a complex concept. The earliest known definition of social cohesion identifies it as an ordering feature of a society, and defines it as "*the interdependence between the members of a society, shared loyalties and solidarity*" (Jenson 1998). Due to its inherent complexity, there are many different aspects of social cohesion including (Berger-Schmitt, 2000):

- The strength of social relations;
- Shared values and communities of interpretation;
- Feelings of common identity and a sense of belonging to the same community;
- Trust among societal members; and,
- The extent of inequalities and disparities.

As an indicator of health, social cohesion is linked to the idea of 'quality of life' which is associated with certain aspects of health and well-being. However, it is important to distinguish between a lack of social cohesion occurring because of differences of opinion among different community groups, or because of a lack of individual social support in the form of personal ties to family, friends, etc. (Berger-Schmitt, 2000). Studies have shown that strong social cohesion and support contributes to self-esteem and strengthens a person's ability to handle stress (Cohen et al. 2000; Poortinga, 2006).

5.7.5.2 Current Conditions

Hermosa Beach is a community that has a high level of well-being and other elements that contribute to positive social cohesion (Blue Zones, 2012). Furthermore, well-being has increased in these communities over the last few years, whereas levels in California and the US have remained static. According to the baseline health assessment (Appendix E) that examined the results of the Blue Zones Project:

> "The baseline survey of 1,332 Beach Cities residents was conducted in 2010. Among its major findings was that the overall well-being rating for residents of Hermosa, Manhattan and Redondo was higher than the California average and above the top tier of other cities. More than 90 percent of local residents said they had access to health care, health insurance and enough money for food, shelter and other basic needs."

As discussed in the EU Report 'Social Cohesion as an Aspect of the Quality of Societies' (Berger-Schmitt, 2000), fundamental elements such as housing, transportation, community resources and social programs all contribute to the fabric of a community and influence the potential for cohesion. However, even when all of the key components are present, social cohesion can be disrupted by controversial issues and divided opinions. In these situations, severe disruptions in social cohesion can potentially contribute to increased stress.

According to a recent poll, 46% of Beach Cities residents (from Hermosa, Manhattan, and Redondo Beaches) felt stressed for most of the day. The poll suggests that there is room for improvement in some areas including; daily stress and worry, treating one another with respect, and being more well-rested (Blue Zones, 2012). Baseline indicators suggest that Hermosa Beach residents are healthy and active, with an exceptionally high level of well-being; however, they may benefit from taking measures to reduce stress in general.

5.7.5.3 Project Impact

Social cohesion is an intricate concept that does not readily lend itself to empirical measurement. However, based on input from community members during the Open House and scoping meeting, community politics surrounding the impending vote is distressing to some. Some local residents have voiced concerns about the situation causing a division in the community – those in favor of oil development versus those opposed. Additionally, there is some worry that the proposed Project could highlight this disagreement and cause friction among individuals. Out of a city of almost 20,000 people, approximately 400 people showed up to the HIA public scoping meeting to voice their opinion on the Project. It is reasonable to assume that those people in attendance were likely interested (whether supportive or critical of the Project) in the issue and that most of the people who did not show up were either unable or uninterested. However, it should be noted that the community Open House was held on a weekend (9 am-2 pm) during summer and the HIA public scoping meeting was on a weeknight (7 pm-10 pm) in the fall in order to accommodate as many people as possible. Therefore, it is unlikely that a large proportion of the community was unable to attend either of the public forums due to scheduling conflicts. Since there are many residents who did not attend public meetings, the impact to social cohesion due to political friction is likely a limited impact. It is not anticipated that the community as a whole is experiencing a distressing lack of social cohesion, to the point of adverse health implications, over this issue.

If some disruption in social cohesion does occur for some members of the community, as a result of differing opinions on the proposed Project, it is important to remember that social cohesion is based on more than a single disputed issue. Instead, it is based on a large number of factors related to the accessibility and functionality of a community as a whole including: housing conditions, access to quality transportation, access to and investment in education, employment opportunities, income and standard of living, and many more (Berger-Schmitt 2000).

It is also important to discuss the fact that people often have differences of opinion or have disagreements regarding certain issues; this is not an uncommon phenomenon. There are many issues that can arise (at home, at work or in other social settings) and lead to different points of view. The health implications of this are largely dependent on an individual's conflict management skills and ability to deal with stressful situations. Although it is not ideal to be in a stressful situation, there are many ways to alleviate stress and these activities should be incorporated into normal routine.

The impact of the proposed Project on the social cohesion of the community is provided in Table 5-35.

Table 5-35 Community Livability Assessment: Social Cohesion

Health Determinant	Social Cohesion
Potential Health Outcome	Potential increase in stress
Pre-Mitigation Discussion	Not Applicable
EIR Mitigation	Not Applicable
Geographic Extent	Community
Vulnerable Populations	None
Magnitude	Low
Adaptability	Medium
Likelihood	Possible
Post-Mitigation Health Effect	No substantial effect
Comments or Additional Recommended Measures	None

With respect to pre-mitigation impacts and EIR mitigation measures, these were considered 'not applicable' since there is no Project construction or operational issue that can be changed with respect to social cohesion. As discussed previously, the extent of the potential impact is '**community'** since it affects all of Hermosa Beach; however, only a subset of the population is expected to experience any disruption in social cohesion (leading to a potential increase in stress) as a result of the proposed Project. There were no vulnerable populations identified for impacts to social cohesion; therefore, it was classified as **'none'**. The magnitude is '**low**' since the impact is minor, temporary or reversible, and does not pose a significant hazard to health. This classification is based on the concept that social disagreements can happen for a variety of reasons, but they are generally repairable and are largely based on individual factors. The adaptability is considered '**medium**' since individuals will be able to adapt and maintain a pre-

Project level of health, although some support may be needed. Although it is believed that the majority of the community will not experience any disruption in social cohesion, those individuals that do may seek support to overcome feelings of stress over personal disagreements. The likelihood some level of discord occurring from the proposed Project is '**possible**' since it the Project is considered controversial; however, this potential impact is anticipated to subside over time following the vote. Therefore, it stands to reason that timely resolution of this issue would be beneficial. Overall, there is considered to be '**no substantial effect'** from changes in social cohesion as a result of the proposed Project. Although we understand that tensions brought on by this Project may have interrupted social cohesion amongst a subgroup of residents, it is not anticipated to overall impact community health. Therefore, no additional measures are recommended.

5.7.6 Political Involvement

5.7.6.1 Political Involvement and Health

One indicator of a healthy community is a high degree of public participation in and control over the decisions affecting one's life, health, and well-being. Involvement in community organizations and the political process are ways that individuals exercise control over decisions that affect their lives (Kawachi et al., 1997).

In the peer-reviewed literature on this subject, group membership and political participation are significantly associated with human health outcomes:

- An analysis of data from 40 diverse U.S. communities showed that people who were involved in electoral participation were 22% less likely to report poor/fair health (Kim et al., 2006).
- A study examining neighborhood environment in England and Scotland, found that if political engagement was low, people had 52% higher odds of reporting poor health (Cummins et al., 2005).
- A higher level of civic engagement through ties to community groups was associated with increased recall of cardiovascular disease health-promoting messages in a longitudinal cohort from the Minnesota Heart Health Program (Viswanath, 2006).

Community and political engagement also increase people's self-efficacy, which is the perceived ability to affect change in one's life. In a report entitled 'Social Cohesion as an Aspect of the Quality of Societies' (Berger-Schmitt, 2000) identified "political activities and engagement" as an aspect of strengthening self-efficacy and the social capital of a society. A strong and integrated social capital was identified as a positive indicator of 'social cohesion', which was also assessed in this HIA (Section 5.5.4).

5.7.6.2 Current Conditions

To our knowledge, there are no publically available data to document the current status of political involvement among Hermosa Beach residents. However, as part of the Community Dialogue process, the committee defined "accessible city government and citizens who are actively involved" as an important quality of life factor that describes the identity of Hermosa

Beach. Since this committee is made up of local residents, this suggests that at least a subset of the community is actively involved in some respect.

5.7.6.3 Project Impact

As part of the legal settlement, there is a unique opportunity in Hermosa Beach for voters to decide for themselves whether to open the community to oil drilling. The City has encouraged community participation throughout the entire process of evaluating the potential impacts of the proposed Project (i.e., EIR, CBA and HIA). Community turnout at the public meetings was respectable, with approximately 300-400 people in attendance. Additionally, approximately 300 people participated in the HIA scoping survey to identify key areas of interest to community members. The Community Dialogue is a group of 15-30 community members who are engaged in activities to help define the quality of life and the vision for the future of Hermosa Beach. The public review process for the EIR and HIA will provide a vehicle for participation from a broader community, including both those in favor of and opposed to the proposed Project.

The impact of having a community that is able to actively participate in the political process, and ultimately decided whether the proposed Project is approved, is strongly associated with positive health and well-being (Berger-Schmitt, 2000). Studies show that for many industrial projects where the decision is based on government (or other regulatory) approval, there is a loss of self-efficacy, increased stress and a feeling of no control (Frumkin, 2010). Because all adult residents will have the chance to vote, everyone in Hermosa Beach has the opportunity to benefit from the opportunity to influence the political process. Ultimately, the decision of whether to move ahead with the proposed Project is in the hands of the community members themselves, which is a rare opportunity with positive health implications. Although the option to vote is open to all, it is unlikely that everyone will participate to the extent that they will benefit from the positive health effects related to political engagement. It is important to note that if community members were not allowed to vote on this issue, there would likely be higher rates of stress and anxiety due to a lack of control and loss of self-efficacy.

The impact of the degree of political involvement afforded by the proposed Project on the health and cohesion of the community is provided in Table 5-36.

Table 5-36 Community Livability Assessment: Political Involvement

Health Determinant	Political Involvement
Potential Health Outcome	Increase in self-efficacy and positive impacts on health and well-being over communities ability to vote
Pre-Mitigation Discussion	Not Applicable
EIR Mitigation	Not Applicable
Geographic Extent	Community
Vulnerable Populations	Voters
Magnitude	Medium
Adaptability	High
Likelihood	Possible
Post-Mitigation Health Effect	Positive
Comments or Additional Recommended Measures	None

Due to the nature of this health determinant, there are no mitigation measures listed in the EIR and thus, a discussion on pre-mitigation impacts is not applicable. The geographic extent of positive impacts, it is classified as '**community'** since all adult residents of Hermosa Beach will have the opportunity to vote. The vulnerable populations identified for political involvement are **'voters'**. The magnitude is classified as '**medium**' since the impact of the community being able to vote on the decision themselves is detectable and poses a minor to moderate benefit to health. Additionally, the ability of the community to adapt and maintain a pre-Project level of health is considered to be '**high'**, since political involvement is anticipated to at least provide the opportunity for pre-Project health status, if not fostering additional improvements in overall health and well-being. This is anticipated since, regardless of the outcome, each community member will have had the opportunity to participate in the political process and cast their vote. This level of self-efficacy has been shown to be associated with positive psychosocial health status (Smith et al 2008). Lastly, the likelihood of the impact is '**possible**' since there is potential for a positive impact to occur but political involvement is an individual decision and although the option to vote is open to all, it is unlikely that everyone will participate. Overall, the health impact of this type of political involvement, particularly the power to vote on the issue, is considered to be '**positive'**. Therefore, based on findings from the political involvement assessment, no additional measures are recommended.

5.7.7 Summary and Conclusions for Community Livability

Commercial and industrial developments have the potential to impact local property values. The complexities around property value fluctuations make it difficult to accurately evaluate the potential impact from one project. The CBA concluded that property values within Hermosa Beach could be impacted by 0-10%; and it was suggested that any decrease in property values is likely to be localized. Any perceived or actual decrease has the potential to moderately increase stress and anxiety among Hermosa Beach residents, which is suggestive of a negative effect on human health.

The community livability assessment within the HIA concludes that with implementation of the proposed EIR mitigation measures there is: no substantial effect on human health with respect to social cohesion; a potential negative effect from stress over property values, aesthetic/visual resources; and a potential positive effect on health from enhanced recreation and green space, educational funding and political

Access to recreational areas and green space is an important community resource and can be a key component of overall health and well-being. Hermosa Beach residents are considered to be very active due to their proximity to the beach, access to parks and availability of recreation and fitness facilities. While the proposed Project would not be removing any existing green space in the community, it will be located adjacent to a park, near other parks, and near walking and biking travel routes. Disturbances during pipeline and Site construction could temporarily affect ready access of recreational resources or the quality of the recreational experience. On the other hand, Project revenue could be used to enhance recreational resources, and it is predicted that there will be an overall positive impact on community health in regards to recreational areas and green space.

Aesthetic value is a complex concept that is highly subjective. There is a high degree of individual variability when it comes to the visual impact and/or aesthetic value of an object or a place. The presence of the electric and workover drill rigs during Phase 2 and 4 have the potential to negatively impact health by diminishing the aesthetic appeal of the landscape. This has the potential to influence levels of annoyance and stress. Therefore, the post-mitigation health effect is considered negative.

Educational funding can provide improvements in some of the key indicators of socioeconomic status (i.e., occupation and income) and has been described as a cost-effective method of increasing health and well-being. Hermosa Beach has one of the top school districts in the country and the modest increase in annual funding that will be provided to the schools as a result of revenue from oil production is expected to have a positive effect on health now and in the future.

Social cohesion is a complex concept that is difficult to measure. As an indicator of health, social cohesion is linked to the idea of ‘quality of life’ which is associated with certain aspects of health and well-being. Hermosa Beach residents experience higher levels of well-being than most California cities. Although it is not expected that all residents will experience a reduction in social cohesion due to differences of opinion, some individuals may. For those residents, this could result in increased stress; however, social cohesion is not considered to have a substantial effect on community health.

Active involvement in local politics is associated with increased self-efficacy and can have positive impacts on health and well-being. Hermosa Beach residents have the unique opportunity to decide whether the proposed Project can go ahead by voting on whether to allow oil drilling within the City. This opportunity extends to all adult members of the community, although only a subset of the population is actively involved in the politics and may benefit from the positive impact on health.

6.0 ADDITIONAL RECOMMENDATIONS, MONITORING AND EVALUATION

The EIR provided a comprehensive and detailed list of mitigation measures legally required to be implemented if the Project moves forward. As the Lead Agency, the City would be required to adopt a program for reporting or monitoring regarding the EIR-specific mitigation measures for the Project, under Public Resources Code Section 21081.6(a) (Findings) and the CEQA Guidelines Sections 15091(d) (Findings) and 15097 (Mitigation Monitoring or Reporting) (MRS, 2014).

The City could consider negotiating these recommendations in the Development Agreement with E&B.

6.1 Recommendations

Odor

In the case that reports of odor become frequent, additional studies and/or air monitoring, for control measures for odor may be warranted.

Upset Scenarios

The spills and blowout assessment within the HIA concludes that there is a low probability of occurrence but in the event such an upset condition was to occur it could have significant negative health implications. This is particularly true in the case of a well blowout. The HIA recommends that City of Hermosa incorporate the possibility of an oil spill or well blowout into their public preparedness awareness program. While the facility is required by regulation to have emergency response plans in place, the preparation of an up-to-date emergency preparedness plan for the community is the duty of the City of Hermosa Beach Emergency Preparedness Advisory Board.

Noise and Light Emissions - Noise

For Phase 3 pipeline construction, it is recommended that local residents and schools be provided written notification of the impending work that identifies the potential for excess noise and outlines the location and duration (expected to be short-term: one week) of the impacts. The notices should also indicate that construction activities would not occur during nighttime hours.

Noise and Light Emissions - Light

For people who have a direct line-of-sight from their bedroom window to the exposed side of the electric drill rig, there is some potential for interference with typical sleeping patterns. For these individuals, it is recommended that E&B provide black-out blinds or curtains to eliminate the potential for infiltration of nighttime lighting from the drill rig for those residents who request them. This is not to suggest that it is essential that residents receive these blinds to protect their health, rather it is a potential solution for those who consider the lighting a serious nuisance. It is recognized that many of the residents of Hermosa Beach may sleep with windows open and this optional measure is not intended to disrupt lifestyle choices. Such measures have also been successful for rural communities living in proximity to wind turbines that are lit at night.

Community Livability – Property Values

To reduce potential stress or anxiety that local property owners may experience as a result of the proposed Project the Applicant could consider having a property value analysis conducted prior to construction, during construction and one year into operations. This analysis would need to take into consideration local, regional and national fluctuations in property values and compare and contrast the data against potential changes in the value of properties located near the proposed Project. This would help to ensure that any observed fluctuations on property values remain within expected levels and consistent with other similar communities. Additionally, the Applicant could consider stabilizing "proven" impacts to property values, perhaps through an arbitration process.

During preparation of this report, a draft development agreement (City of Hermosa Beach, 2014) was released that contains some consideration of stabilizing property values. The draft agreement states that *"similar to Huntington beach, E&B proposed setting up and funding an account that would stabilize proven impacts to property values for 5 years (during drilling) for properties in close proximity to the project. E&B clarified that the timeframe was undecided at this time. It further clarified that the residents would need to voluntarily apply for this program."* (City of Hermosa Beach, 2014). This proposal is similar to the additional mitigation recommended in the HIA to further reduce potential impacts from stress and anxiety over property value fluctuations.

Community Livability – Access to Recreational Resources and Green Space:

To maximize health benefits from enhanced access to green space and recreational activities the City should consider a community advisory group on how to spend revenue.

6.2 Monitoring

The requirement for the mitigation monitoring program is detailed in Section 8.0 of the EIR (MRS, 2014). Throughout the life of the proposed Project there would be EIR mandated and potentially additional regulatory monitoring requirements (e.g., air quality, surface water containment, odor, noise, and contaminated soil removal). Monitoring of this nature will ensure that predictions in the EIR (and subsequently relied upon in the HIA) were accurate and that conclusions on environment and health were based on accurate data predictions.

The recommendations in the HIA do not require formal monitoring outside those already required by the EIR. However, the HIA Team believes that monitoring of community livability and quality of life indicators could be important for understanding whether the Project (Phases 1 to 4) may influence certain aspects of community livability in Hermosa Beach. The following monitoring recommendations have been made for the City to consider including in discussions around the Development Agreement.

Community Liaison Committee (CLC)

Consideration should be given to forming a Community Liaison Committee (CLC) if the Project is approved, and prior to commencement of construction activities. These CLCs have proven to be very useful in the other situations involving industrial development in proximity to communities, including the waste-to-energy municipal waste sector. The term CLC is used to distinguish it from other Community Advisory Groups formed by the City. The CLC would be comprised of a small number of City staff, E&B, and local residents. Typically, a call would go out for interested citizens to apply to become a member of the committee, with selection of members being conducted jointly between City staff and E&B. The CLC would serve as the vehicle through which citizens could voice active concerns about Project activities. These concerns could be raised indirectly through the committee representatives or directly presented to the committee as a whole. The intention of the committee would then be to work collectively to find ways to address residents' concerns. The CLC could meet monthly, quarterly or semi-annually depending on the level of concern raised within the community. Once the Project is fully operational the CLC would still be expected to meet semi-annually to review environmental monitoring and compliance data. In no way should the CLC replace the responsibilities or legal requirements of the Lead Agency. The cost for such a committee would be dependent largely on access to meeting space and on whether an external facilitator was to be used. Community member representation would be volunteer, unpaid positions.

Follow-up Community Health Assessment

In terms of direct community health monitoring, the health statistics reported in LA County and state-wide databases, including data on mortality, cancer rates, birth outcomes, and others, could be monitored to assess whether or not any changes from baseline occur. Analysis of health statistics by vulnerable population status could identify whether some groups are disproportionately impacted by Project operations. These retrospective health reviews are useful but it should be recognized that based on data lag times they typically report on health outcomes two or more years after they occur. An update to the baseline health study could be completed five years after the Project becomes operational, but its requirement would depend on the level of concern within the community at that time. The design of the community health assessment, including indicators to be included, analysis methodology, and timing of monitoring, should be developed with input from stakeholders, the City and the Applicant. If the proposed Project moves forward and community health monitoring is approved, the City should work with the Applicant to hire the appropriate party to develop the scope and conduct the study. Such an undertaking is difficult to scope at this point but would likely cost $50,000 to $100,000.

Quality of Life (QOL) Health Survey

Hermosa Beach is recognized as a healthy city with favorable demographic health indicators and mortality rates, compared to other cities in California and LA County. However, there are limited data available to quantify potential health impacts of the Project on sleep disturbance, stress, social cohesion and other quality of life factors. A quality of life (QOL) health survey could be used as a tool to establish current baseline conditions, and to monitor whether health status changes during the Project. There are well established survey tools available (SF-36 and Pittsburgh Sleep Quality Index [PSQI]) that could be employed. The most cost-effective means of delivering these surveys would be on-line; however, data quality collection can be compromised. Mail drops could also be considered. This survey would then be followed up after operations began. The costs for a properly conducted QOL survey in the community with follow-up would again range from $50,000 to $100,000.

6.3 Evaluation

Although not a component of all HIAs, the evaluation step can demonstrate the effectiveness of HIA in the planning process by assessing what the HIA actually achieved. An internal evaluation of the overall approach and effectiveness of the HIA will be conducted by Intrinsik's HIA Team. The City of Hermosa Beach may also wish to evaluate the utility of the HIA to identify aspects of the process that were beneficial, and those that could be enhanced, if HIAs are going to be conducted in the future.

As part of the internal HIA evaluation, the Intrinsik team will conduct both a process evaluation and an impact evaluation (Taylor et al., 2003). The process evaluation is intended to provide lessons on how and why the HIA was successful and where the process could be improved, whereas the impact evaluation considers whether and how well the HIA fulfilled its intended purpose. The following are key questions that will be asked as part of the process and impact evaluations (Taylor et al., 2003):

<u>Process Evaluation:</u>

- What resources were used for the HIA and what was the total cost?
- What evidence or data were used to inform the HIA and how did they shape the recommendations?
- How were decision makers and other stakeholders involved in the process, what influence did this have on the different steps of HIA (i.e., screening, scoping, assessment, etc.)?
- How were health inequalities (e.g., vulnerable populations) considered in the HIA?
- How was the HIA communicated to decision makers and was this approach successful?
- What did those involved think of the HIA process?
- Did the HIA complement the EIR? Would it have been more appropriate to integrate the HIA into the EIR?

<u>Impact Evaluation:</u>

- Were the aims and objectives of the HIA met? If not, why?
- How and when were the recommendation measures implemented by the decision makers and what were the contributing factors?
- If some measures were rejected, why did this happen? What could enhance future recommendations?
- Were there any unintended consequences associated with the HIA (positive or negative)? For example, fostering partnerships with organizations, public health agencies, and other stakeholder groups, or disenfranchising any of these groups?

Overall, the results of the internal evaluation process will help to inform and enhance future HIAs to be conducted for the City of Hermosa Beach. Although not required, it is recommended that any discussions or outcomes from the HIA evaluation process be documented.

7.0 LIMITATIONS AND UNCERTAINTIES

The HIA was commissioned by the City without any formal regulatory requirement to do so. Additionally, the HIA process included extensive input from community members. The HIA Team benefited tremendously from our interaction with the citizens of Hermosa Beach. It was clear through the open houses and community meetings that there are a great number of people who feel passionately on both sides of this issue. Ultimately, these interactions allowed the HIA Team to appropriately scope the assessment and focus on determinants of health that are most important to community members.

It is believed that this is one of the most comprehensive HIAs undertaken for an oil and gas project in North America. We know that HIA continues to be an emerging field of science in the practice of environmental health. There is no nationally or internationally accepted guidance for conducting HIA. Therefore, similar to quantitative chemical human health risk assessments, it is important to document the limitations and uncertainties associated with this undertaking.

Where possible the HIA Team relied on quantitative methods to assess the potential for health effects related to Project activities (e.g., air quality issues). However, not all determinants could be assessed using quantitative methods and either semi-quantitative or qualitative methods were employed based on annoyance or nuisance thresholds, public discussions, scientific / social science literature, and professional experience. It was important to the HIA Team to ensure that details were provided for how each determinant was assessed and the rationale behind the outcomes of the assessment. This way regardless of the HIA's limitations individuals, stakeholders and decision makers can review the available information and draw their own conclusions.

In general, HIAs seek to discuss the potential impact on vulnerable populations of society that may be disproportionately affected by the project. Invariably, children and the elderly are considered to be sensitive subpopulations with respect to numerous different types of environmental exposure. This is also true for many of the determinants that were evaluated in the HIA. Each of the assessments on health determinants included a discussion of potential vulnerable populations. However, the exact number of people that represent a vulnerable population for each health determinant was not available to the HIA team and this represents a limitation of the HIA.

The HIA Team did not interview or speak with representatives of E&B directly while undertaking this project. Further, the HIA was reliant on data, information and mitigation measures identified in the Final EIR. Our assessment and conclusions are subject to the limitations and uncertainties associated with their report, and are dependent on the effectiveness of the required mitigation measures.

Finally, the initial draft HIA was prepared concurrently with the draft EIR and CBA. This less than ideal situation resulted in the initial draft HIA not always having assessed the determinants of health based on the post-mitigation scenarios provided in the Final EIR. Therefore, this report supersedes any previous draft, presentation or correspondence regarding the findings of the HIA. While the Final HIA had the benefit of the complete analysis and mitigations presented in the Final EIR, the CBA has not been finalized as of the release of this report. The HIA did not rely as heavily on information from the CBA compared to the EIR. Therefore, changes from the draft to the final version of the CBA are not expected to have a major impact on the HIA findings.

In addition, the following limitations were noted for the baseline health assessment:

- The small population in Hermosa Beach made it difficult to find data specific to the City. For example, while information hospitalizations due to asthma were presented, asthma rates for Hermosa Beach were not available. The lack of more specific asthma information is a significant data gap in this assessment.
- Where prevalence and mortality data were available for Hermosa Beach, they were not presented according to categories of race, age, gender, etc. Therefore, rates could not be adjusted for appropriate comparison to either LA County or the State of California.
- In addition, small numbers did not allow making statistical comparisons to other geographic locations.
- The pedestrian safety assessment was conducted over five years ago and many improvements have taken place since then, including the Pier Avenue streetscape improvements. However, other streets have not undergone similar pedestrian improvements since that time and are considered representative of current conditions.
- Ambient air pollution data were available for the Southwest Coastal region, which includes Hermosa Beach but also includes the Los Angeles international airport and other facilities (i.e., the El Segundo refinery) considered to be potential sources of air pollution. Therefore, the aggregate data may not be representative of the Hermosa Beach and likely overestimates pollution levels within the local community.

Overall, this HIA employs standard health risk assessment and health impact approaches, guidance and regulatory requirements, where possible. It attempts to provide an unbiased analysis of the potential for the Project to have negative, positive or no substantial effects on the health of the community of Hermosa Beach. It is not meant to advocate for any particular position with respect to the proposed Project. Rather, the intention is to provide decision makers (in this case the voting public) with health-based evidence that may help to inform their choice.

8.0 CONCLUSIONS

The HIA considered 18 determinants of health that fall under six major categories and were identified as community priorities. Additionally, consideration was given to those determinants that are most likely to be impacted by the proposed Project. Each of these outcomes was carefully assessed using a combination of quantitative, semi-quantitative and qualitative approaches where appropriate. Ultimately, the aim of the assessment was to determine whether the Project (post-mitigation) could potentially have a negative, positive or no substantial effect on the health of the community (Table 8-1).

The following were the major findings for the six categories examined:

Air Quality

The air quality assessment within the HIA concludes that with implementation of the proposed EIR mitigation measures there is no substantial effect on human health with respect to air emissions (NO_2, PM and TAC). However, periodic odor releases during production operations (Phases 2 and 4), identified in the EIR as significant and unavoidable, were characterized as negative near the Project Site. Odor can have various health consequences, and could result in periodic discomfort and annoyance near the Project Site.

Water and Soil

The water and soil quality assessment within the HIA concludes that with implementation of the proposed EIR mitigation measures, there is no substantial effect on human health with respect to surface water quality and soil particulates during any Phase of the proposed Project..

Upset Scenarios

Upset scenarios included the possibility for a crude oil spill into the ocean or a well blowout. The oil spill assessment concludes there is no substantial effect with implementation of the proposed EIR mitigation measures through Phases 1 to 4. The blowout assessment within the HIA concludes that there is a low probability of occurrence, but in the event such upset conditions were to occur, they could have significant negative health implications. The HIA also found a negative health effect of stress due to fear of a blowout accident. The HIA recommends that the City incorporate the possibility of an oil spill or well blowout into its current emergency preparedness plan.

Noise and Light

The noise assessment within the HIA concludes that, with implementation of the proposed EIR mitigation measures, there is no substantial effect on human health from Phase 1, 2, 3a (site construction) and 4, and a potential negative impact from pipeline construction activities in Phase 3b. Therefore, it is recommended that written notification be provided to residents and schools in the vicinity of these activities that identifies the potential for excess noise and outlines the location and duration of the impacts.

The light assessment within the HIA concludes that, with implementation of the proposed EIR mitigation measures, there is no substantial effect on human health with respect to light emissions; however, there is potential for nearby individuals to experience disruption of typical sleep patterns during periods when the drill rig is present (Phase 2 and intermittently in Phase 4). Therefore, it is recommended that black-out blinds/curtains be provided as an option for residents whose bedroom windows are in the direct line-of-sight of the exposed portion of the electric drill rig to eliminate any infiltration of outdoor lighting.

Traffic

The traffic assessment examined the potential for increased truck and other traffic to impact pedestrian, bicyclist, and motor vehicle safety and the potential for perceived traffic hazards to impact people's walking and bicycling choices. The traffic assessment within the HIA concludes that, with implementation of the proposed EIR mitigation measures, there is no substantial effect on human health with respect to traffic safety and perceived traffic safety hazards during any Phase of the Project.

Community Livability

The community livability assessment evaluated a number of community aspects that are valued by the citizens of Hermosa, including: property values, access to green space (parks and recreation), aesthetics (view), education funding, social cohesion, and political involvement. The community livability assessment within the HIA concludes that with implementation of the proposed EIR mitigation measures there is: no substantial effect on human health with respect to social cohesion; a potential negative effect from stress over property values, aesthetic/visual resources (while drill rigs are erected in Phases 2 and 4); and a potential positive effect on health from enhanced recreation and green space, educational funding and political involvement activities.

Overall Conclusion

There is no simple answer to the potential impact that the Project will have on the health of Hermosa Beach residents since different aspects of the proposed Project will impact the community in different ways. We caution that the assessment and conclusions are based on population health and not on single individuals. There are some aspects of the Project that may positively influence health (e.g., increased education funding, ability to enhance green space), and at the same time there were potential negative health outcomes identified (e.g., odor, blowouts, property values). With the exception of accidents, the negative health outcomes were largely nuisance related (e.g., odor, aesthetics) without irreversible health impacts. The majority of the health determinants examined revealed that the Project (post-mitigation) would have no substantial effect on the health of the community.

Based on the Final EIR mitigation measures and additional recommendations provided in the HIA, on balance we do not believe that the Project will have a substantial effect on community health in Hermosa Beach. Ultimately it is the voters of Hermosa Beach who will decide whether the impacts described in this HIA are acceptable or not.

Table 8-1 Health Impact Assessment Summary Based on Post-Mitigation Measures

Health Determinant	Potential Health Outcome	EIR Mitigation Measures	Geographic Extent	Vulnerable Populations	Magnitude	Adaptability	Likelihood	Post-Mitigation Health Effect	Comments or Additional Recommended Measures
Air Quality									
Nitrogen Dioxide (NO_2) Emissions	Respiratory irritation and airway constriction	NOx reduction program (AQ-1b), limited flaring (AQ-3a), and air monitoring plan (AQ-5d)	Localized	Children; elderly; pre-existing cond	Low	High	Unlikely	No substantial effect	None
Particulate Matter (PM) Emissions	Morbidity (e.g., cardio-pulmonary effects) and mortality.	Limited flaring (AQ-3a), limited microturbine PM emissions (AQ-4), air monitoring plan (AQ-5d), and diesel emission requirements (AQ-7a)	Localized	Children; elderly; pre-existing cond	Low	High	Unlikely	No substantial effect.	None
Toxic Air Contaminants (TAC) Emissions	Varies for the TACs. Includes acute effects, chronic non-carcinogenic and carcinogenic effects.	Air quality mitigation measures (AQ-1a, AQ-1b, AQ-3a, AQ-3b, AQ-4, AQ-5a through AQ-5f, AQ-6, AQ-7a, AQ-7b)	Localized	Children; elderly; pre-existing cond	Low	High	Unlikely	No substantial effect.	Cancer risks, chronic non-cancer risks and acute risks will be below threshold values post-mitigation.
Odor Emissions	Acute health symptoms from odiferous compounds in crude oil	Air quality mitigation measures to reduce off-gassing of vapors from drilling muds (AQ-3b) and for operational odor controls including an Odor Minimization Plan (AQ-5a through AQ-5f)	Localized	Odor sensitive individuals	Medium	Low	Possible	Negative	Periodic discomfort and annoyance from odor releases is likely. If frequent reports of odor occur, additional study and/or periodic monitoring of odor may be warranted.
Water and Soil									
Surface Water	Acute health symptoms	Storm Water Pollution Prevention Plan (HWQ 1-1a to 1-1g)	Localized	Beach users	Medium	Medium	Unlikely	No substantial effect	None
Soil Particles	Varying degrees of human health risk	Fugitive Dust Control Plan (AQ-1a) and soil sampling (SR-2)	Localized	Children	Unknown	Unknown	Unlikely	No substantial effect	None
Upset Scenarios									
Crude Oil Spill	Acute health symptoms and psychological effects including stress	An independent third party audit of equipment and additional upset scenario risk reduction measures (SR-1a through SR-1g)	Localized	People in immediate vicinity	Medium	Medium	Unlikely	No substantial effect	Incorporate well blowout scenario into the City of Hermosa preparedness plan
Well Blowout	Injuries and/or fatalities and psychological effects including stress	An independent third party audit of equipment and additional upset scenario risk reduction measures (SR-1a through SR-1g)	Localized	People in immediate vicinity (est. max 750 ft)[1]	High	Low	Unlikely	Negative	Incorporate well blowout scenario into the City of Hermosa preparedness plan
Noise and Lighting									
Noise Emissions	Annoyance, stress, sleep disturbance and hypertension and cognitive impairment at very high sound pressure levels	Noise mitigation measures Phase 1: NV-1a to NV-1c Phase 2: NV-2a to NV-2j; NV-3a to NV-3d Phase 3a (site construction): NV-4a to NV-4c Phase 3b (pipeline construction): none Phase 4: NV-6a to NV-6h; NV-7a to NV-7c	Phase 1-4: Localized (Project Site and truck /pipeline routes)	Residents and schoolchildren in proximity to pipeline route	Phase 1: Low Phase 2: Low Phase 3a: Low Phase 3b: Medium Phase 4: Low	Phase 1: High Phase 2: High Phase 3a: High Phase 3b: Medium Phase 4: High	Phase 1: Possible Phase 2: Possible Phase 3a: Possible Phase 3b: Probable Phase 4: Possible	Phase 1: No substantial effect Phase 2: No substantial effect Phase 3a: No substantial effect Phase 3b: Negative Phase 4: No substantial effect	In anticipation of potential elevated noise levels from pipeline construction activities (Phase 3b) it is recommended that local residents be provided with written notification of impending work including the dates and times of activities that may produce excessive noise.
Light Emissions	Annoyance, stress and possible disturbance of typical sleep cycles	Light mitigation measures Phases 2-4: AE-4a to AE-4c; AE-5a to AE-5e; AE-6a to AE-6b	Localized	People with a direct line-of-site of the lit side of electric drill rig at night	Low	High	Unlikely	No substantial effect	Although the magnitude is 'low' for the majority of residents, it could be higher for those individuals with a bedroom window in the direct line-of-sight of the exposed side of the electric drill rig that will be lit at night. It is recommended that these individuals be provided with the option of black-out blinds or curtains to eliminate any potential impact to typical sleep patterns.

Table 8-1 Health Impact Assessment Summary Based on Post-Mitigation Measures (con't)

Health Determinant	Potential Health Outcome	EIR Mitigation Measures	Geographic Extent	Vulnerable Populations	Magnitude	Adaptability	Likelihood	Post-Mitigation Health Effect	Comments or Additional Recommended Measures
Traffic									
Traffic Safety	Potential increase in number of pedestrian, bicycle or other injuries	Traffic mitigation measures (TR-1a through TR-1d)	Localized	Pedestrians and cyclists (Children and the elderly)	High	Medium	Unlikely	No substantial effect	None
Perceived traffic hazards	Decrease in active transportation	Traffic mitigation measures (TR-1a through TR-1d)	Localized	Pedestrians and cyclists (Children)	Medium	Medium	Unlikely	No substantial effect	None
Community Livability									
Property Values	Potential increase in stress and anxiety	Not Applicable	Localized	Property owners	Medium	Medium	Possible	Negative	E&B could consider evaluating housing prices for those in the immediate vicinity of the Project Site.
Access to Recreational Resources and Green Space	Change in physical activity levels, which can lead to other health issues	Not Applicable	Community	None	Medium	High	Possible	Positive	To maximize potential health benefits from access to green space and recreational activities the City should form a community advisory group on how to spend revenue.
Aesthetics and Visual Resources	Annoyance and stress from negative perceptions and anxiety over project aesthetics	Aesthetic and visual mitigation measures AE-1a to AE-1b; AE-2a to AE-2d; AE3a to AE-3c	Community	None	Medium	Medium	Possible	Negative	The overall impact is negative based on the aesthetic environmental change leading to increased levels of annoyance and stress in some individuals.
Education Funding	Increased resources and funding for education can indirectly lead to a more positive health status	Not Applicable	Community	Schoolchildren	Medium	High	Probable	Positive	None
Social Cohesion	Potential increase in stress	Not Applicable	Community	None	Low	Medium	Possible	No substantial effect	None
Political Involvement	Increase in self-efficacy and positive impacts on health and well-being over communities ability to vote	Not Applicable	Community	Voters	Medium	High	Possible	Positive	None

[1]Figures 4.8-5 and 4.8-6 of Final EIR provide estimated range and map, respectively (MRS, 2014)

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Appendix A

Summary of Los Angeles Urban Drilling Sites

Appendix A: Summary of Los Angeles Urban Oil Drilling Sites

Region	Oil Field	Location	Production	Urban Features	Health and Environmental Concerns
Inglewood	Inglewood	underneath the Baldwin Hills, between Culver City and Inglewood	produces more than 3 million barrels of oil per year from 430 active wells	largest remaining contiguous oil production landscape (950 acres) in urbanized Los Angeles, neighbors are more than 1,000 feet from drilling activities	in 2006, gasses entrained in drilling muds were released and detected by neighbors; 2011 CEQA lawsuit settlement resulted in: reduced drilling of new wells, increased air quality monitoring, more stringent noise limits, and mandatory health assessments
Westside and Downtown	Sawtelle	underneath Veterans Administration land on both side of the 405 Freeway	18 wells, extracting 175K barrels per year	accessed on the Veterans Administration campus	
	Cheviot Hill	underneath much of Century City	2 well sites remain active, extracting 57K barrels per year	accessed through sites located on two separate golf courses	
	Beverly Hills	extends from Century City to past Fairfax, centered under Pico	90 operating wells, producing more than 850K barrels per year	accessed through three urban well sites - one operates within Beverly Hills High School	in 2003 a suit was filed alleging the well site was responsible for a higher than average cancer rate at the highschool but the case was later dismissed
	Salt Lake	underneath city from Beverly Hills to the Wilshire	40 operating wells	accessed on the west side of the Beverly Center mall	oil field seeps caused a 1985 methane explosion at a Ross Store (across from the Fairfax Farmers Market, injuring over 20 people)
	Las Cienegas	extends from La Brea to downtown Los Angeles	27 oil and gas producing wells producing 0.5 million barrels per year	accessed through 4 sites set among residential properties	increassed drilling activityon West Adams in 2004 promprted neighborhood compliants about noise and odor
	Los Angeles City	underlies an area on the north side of downtown, from Hoover to Dodger Stadium	Almost entirely shut down, producing just 1.2K barrels of oil	hundreds of wells drilled throughout the urban area	methane seeps and hydrogen sulfide odors led to safety concerns for highschool built on top of field
	Los Angeles Downtown	underneath the Staples and Convention Center area	12 extraction and 2 injection wells, producing 35K barrels per year	well site on Hill Street	steam injection at the site is thought to be responsible for ooze that came to the street surface in 2006, prompting street closures and evacuations
Eastern and Inland	Montebello	underneath Montebello hills	produces over 600K barrels of oil per year	surrounded by a shopping mall, housing, a closed dump, and Whittier Narrows dam and basin	
	Bandini	underlies part of East Los Angeles	20K barrels per year	clusters of pumpjacks around rail yards south of the I-5 and I-710 intersection	
	East Los Angeles	underlies part of East Los Angeles	40K barrels per year	a dozen pumpjacks operate amidst office and warehouse spaces	
	Santa Fe Springs	under the city of Santa Fe Springs	160 wells produce 600,000 barrels per year	most pumping takes place in office parking lots	
	Walnut	small field in La Puente, next to the City of Industry	produces around 8K barrels per year	pumpjacks within golf course	
	Whittier	along the southern base of the oil field	produces around 125K barrels per year	active oil fields have held back full suburban development	current court case and community concerns that opening the hills to drilling will result in impacts to human health and the environment
	Sansinena	Puente-China corridor, between Whittier and Brea-Olinda	pruduces around 260K barrels per year		
	Brea-Olinda	west of Highway 57, on the LA/OC line	historic site but still operating more than 500 active wells, producing more than 1.1 million barrels per year		
	East Coyote	northern Orange County	69 wells extract around 200K barrels per year	covered over mostly by housing and a golf course	
	Yorba Linda	contiguous with the east end of the East Coyote Oil Field	most wells capped but still produces 20K barrels per year	has been taken over by suburban development	
	Richfield	just south of Yorba Linda	around 100 active wells, around 340K barrels per year	scattered pumpjacks around the community in recently developed part of Yorba Linda	
	Olive	west of Anaheim	3 active wells, 18K barrels per year		
	Esperanza	underlies hills east of Yorba Linda	8K barrels per year		
	Chino-Soquet	underlies hills southwest of Chino	1.2K barrels per year	near the edge of Chino Hills State Park	
	Mahala	underlies hills between the Prado Dam and Chino Hills State Park	1.5K barrels per year	undeveloped area	

Appendix A: Summary of Los Angeles Urban Oil Drilling Sites

Coast and South Bay	Playa del Rey	underlies the marina and Ballona Creek estuary	over 100 closed and capped wells, few operating wells remain, former wells currently serve as major natural gas storage area		
	Hyperion	underneath the west end of LAX	small oil field, only one well produces about 10K barrels of oil per year		
	El Segundo	underlies much of the community and refinery at El Segundo	most wells are inactive, two producing wells yield around 15K barrels per year	two active wells in the industrial part of El Segundo	
	Howard Townsite	underlies an area along the 105 Freeway north of Gardena	4 active wells produce less than 10K barrels per year	on houselots between homes and businesses	
	Rosecrans	underlies a mostly industrial area along the 110 Freeway, between Gardena and Compton	produces around 150K barrels per year	46 active pumpjacks along railway, freeway, in industrial yards, parking lots, and house lots	
	Torrance	underlies a wide area of developed land in the South Bay	producing nearly 400K barrels per year, former directionally drilled oil wells in the harbor area at Redondo Beach are now capped off	100 wells are scattered in residential and retail areas	
Harbor and Long Beach	Long Beach	underlies the Signal Hill Area, south of the Long Beach Airport	nearly 300 active wells produce more than 1.5 million barrels per year	wells scattered in retail, industrial, and residential areas of Signal Hill	
	Wilmington	under the port and city of Wilmington, extending from Torrance to Seal Beach including offshore portions	the most productive oil field in the Los Angeles Basin (3.5 million barrels per year), 1,300 active wells	pumpjacks scattered around the city	extensive pumping has led to land subsidence over the whole of port area -as low as 29 feet
South Coast	Seal Beach	underlies the estuary of the San Gabriel River	130 wells producing around 500K barrels per year	clusters of pumpjacks around housing and marinas	
	Huntington Beach	underlies much of Huntington Beach	produces nearly 2 million barrels per year	two offshore platforms and 200 wells extending for over a mile along PCH	other parts of the land have been restored to natural habitat (marshland)
	West Newport	on the Coast at the mouth of the Santa Ana River	produces around 100,000 barrels per year from 100 wells	undeveloped Ranch site holds most of pumpjacks	

Source: CLUI 2010, grey shading indicates no information was available (does not indicate that health concerns are not present)

Appendix B

Scoping Checklist

Health Category	Typical Outcomes Considered in this Category	Current local health consideration?	How may the project impact health and wellbeing of local community?	Is an in-depth HIA necessary that examines this area in more detail?
Chemical exposures	Greenhouse Gases	There are no existing facilities in Hermosa Beach with reported GHG emissions. The closest facility is the AES Power Plant that generated 93,255 metric tons CO2 equivalent in 2010.	Long-term greenhouse gas emissions exceed the SCAQMD level of significance of 10,000 metric tons CO2 equivalent	No. While Hermosa has a goal of being carbon neutral, greenhouse gases cannot be adequately evaluated in this HIA given the broad implications.
	Air Quality - fugitive dusts, criteria pollutants, VOCs, mercaptan	Current levels of particulate air pollution in the vicinity of Hermosa Beach approach and/or exceed air quality standards.	Air quality assessment will rely on the air toxics risk assessment conducted in the EIR. Close loop system indicates local emissions will not be impacted.	Yes. There is strong evidence linking air quality with increase disease and death rates.
	Water Quality - petroleum hydrocarbon contamination of groundwater, ocean water	The Santa Monica Bay surface waters are listed as impaired under the Clean Water Act due to contamination DDT and PCBs, and coliform bacteria.	The storm water plan includes the containment of all storm water during Phase 2, so that storm water infiltrates and evaporates onsite. Pollutant discharge will be contained by walls and berms onsite.	Yes, community members prioritized water and other environmental quality.
	Soil - fugitive dusts carried to surrounding areas	Current city maintenance yard has elevated levels of lead, which are above commercial and residential risk-based values.	Residents and recreational users could be exposed to lead and other contaminants in surface soil around the Site	Yes, uncertainties regarding current site contaminants and fate and transport of lead in dust require further evaluation
Physical Hazards/Nuisances	Noise	Daytime L50 Noise Standard of 50 dBA is currently exceeded by light manufacturing propoerties to the west and residential properites to the north and east, however residential areas may still be impacted.	Increase in daytime and nighttime noise levels may cause sleep disturbances	Yes, nighttime noise disturbances have the potential to be above current conditions. The amount of noise increase requires further evaluation.
	Light	Existing conditions are typical of a residential neighborhood. Limited lighting at night such as streetlights. Parking lot lights illuminate the public parking area.	The lighting, as proposed in the Applicant's Lighting Plan, would be designed to be directed downward and shielded in order to avoid obtrusive light spillage beyond the Project site, reflective glare, and illumination of the nighttime sky.	Yes. Although impacts may be minimal if lights are shielded and cast downwards, there is uncertainty associated with the amount of lighting that will be needed onsite. Evaluation of other nighttime work zone lighting scenarios may provide additional information.

	Vibration	Vibrations may disturb surrounding light manufacturing and residential properties.	10 types of equipment were modeled to produce vibration levels of 0.5 psi, as described in the project description. The EIR predicts vibration will have minimal health impact.	No. Health impact not anticipated, and vibrations are not a health concern of the community.
	Odor	No known odor complaints in the current light manufacturing area by the proposed site.	Odor events could occur from production equipment or drilling upset conditions. Main concerns are hydrogen sulfide, combustion gases and mercaptan.	Yes. Odor distrubances are often reported at urban drilling sites, and may impact health in the surrounding neighborhood.
Infectious disease	Changes to groundwater/wetlands that provides habitat for vector-borne disease	No existing vulnerabilities	None identified	No, no wetlands areas exist. There are a lack of existing surface water features in the City and surface water runoff is expected to be contained onsite.
	Crowded living and working conditions can increase risk for disease transmission	No existing vulnerabiltiies	Total number of workers during any given phase will be a peak of 35 employees.	Not relevant to this project, because the number of employees is small
Food, Nutrition, Physical Activity	Micronutrient deficiencies	Hermosa Beach has access to a large amount of fresh and healthy food choices, including supermarkets and a Farmers Market.	None identified	No, potential health impacts were not identified
	Physical activity	2 out of 5 beach cities adults do not meet the federal physical activity guidelines	Environmental contamination or percieved risk of environemntal contamination may decrease physical activity frequency	Yes, community values outdoor activities and healthy lifestyle
	Pedestrian Rerouting	Existing sidewalks on 6th and 8th streets are interrupted and not friendly to pedestrians. Existing sidewalks along Ardmore/Valley andVeteran's Parkway greenbelt are very pedestrian family.	Phase 1 - sidewalks along Valley and 6th street/8th street intersectionswould be closed; Phase 2 - none; Phase 3 - sidewalks along Valley and 6th street, add a sidewalk on 6th street; Phase 4 - none.	Yes, walkable city lifestyle is an important quality of life indicator in Hermosa
Accidents/Injuries	Oil pipeline rupture	No existing oil pipelines	Project description estimated 2 per 10,000 per year, maximum of 778 barrels	Yes. Although low probabilitiy of occurrence, could result in severe health impacts
	Includes fatal and non-fatal injury patterns	No existing oil trucking activities	Truck accident rate of 4.2 per 1,000 per year, maximum of 160 barrels	Yes. Addition of truck traffic could negativiely impact safety and phsycial activity.

	Project-related income and revenue to improve infrastructure	Community members are interested in project revenue to support City resources such as a new sewer system, and improved school programs	Possible that revenue could contribute to city projects and community programs	Yes. Improved community resources are linked with positive health outcomes.
Water and Sanitation	Increase demand on water and sanitation infrastructure because of projects need or non-resident workers	Water in California is in high demand.	Need to find alternative water source.	No. Alternative sources of water and improved sanitation infrastructure are both possible, if needed.
	Revenue from the project that supports construction and maintenance of water & sanitation facilities	Community would like to improve sewer system infrastructure	Positive impact	No. Not a priority listed in community comments and input.
Social Determinants of Health	Depression, anxiety	Hospitalization rate due to mental illness lower than California reference population	Project-related environmental hazards could impact psychological health through noise and odor distubrances, or reducing access to green spaces and the outdoors	Yes. Include this health outcome in literature searches of possible impacts.
	Suicide	Mortality rate from suicide 1.3 per 10,000 people (2009-2010)	Depression and other psychological health impacts of project could lead to suicide.	Yes. Include this health outcome in literature searches of possible impacts.
	Substance/alchohol abuse	Hospitalization rate due to alcohol-drug use and alcohol-drug induced mental disease higher than California reference population	Substance abuse is associated with other adverse chronic health outcomes	Yes. Include this health outcome in literature searches of possible impacts.
	Cultural integrity/change	Current beach culture and lack of industrial influence	Possibly change the identify of Hermosa as a "The Best Little Beach City"	Yes. The city's character influence social behavior and overall wellbeing of community.
	Education	High educational attainment- nearly 99% of Hermosa residents over age 25 have attained highschool education or greater, nearly 70% have bachelor's degree or higher	Possible revenue from project could support schools and districts.	Yes. This possible outcome is important to community members, and education is one of the most important health indicators.
	Community Political Stress	Residents are politically engaged	Some feel the impending vote is dividing the community and pitting them against one another (cite personal interations with community members)	Yes. Community members are interested in this health determinant being assesed.

	Income/ Poverty	Median annual household income is over $100,000; 3.6% of Hermosa reisdents living below poverty level	Property value fluctuations may change personal revenue	Yes. Community members have expressed interest regarding the potential impact on property values.
Healthcare Access/Insurance	Increased demands	No hospitals identified in Hermosa, however a large number of health resources exist within 5 miles of hermosa	Increase in disease rates could cause increase in medical costs	No. Access to health resources was not identified as a vulnerability.
Earthquakes/Subsidence	Catastrophic event, emergency response capability	Nearby seismic activity from 1981 to 2010 was surveyed. There was one shallow earthquake (less than 5 miles below ground surface) in Wilmington Oil Field, and none in Torrance Oil Field including Redondo Beach area (Geosytnec 2013).	Low probability and high risk	No. The project proposes sufficient mitigation measures to reduce the risk of earthquakes/subsidence. Subsidence will be monitored and project activities will stop if subsidence is measured more than 1 ft.
General Health and Wellbeing	Population health indicators (i.e. life expectancy, mortality, infant mortality, child <5 mortality, quality-adjusted life years)	Hermosa appears to have a favorable mortality profile compared to Los Angeles County	Possible increase in mortality rates	Yes. These health indicators were included in the literature search.
	Cancer	Cancer rates in Hermosa do not exceed expected rates given population demographics. Lower rate of colorectal cancers observed	Possible increase in cancer rates	Yes. Cancer will be included in literature search of available public health data.
	Survey-based measures of community well-being	No data available	Possible decrease in well-being factors	Yes. Community well-being factors will be considered in all potential health impacts.
Maternal-Child Health	Prematurity rate	See Maternal Age	Possible increase in prematurity rate	Yes. Prematurity rate was included in search terms for environmental hazard literature searches.
	Adolescent preganancy rate	No vulnerabilities identified	None identified	No, no project impacts identified
	Adequacy of prenatal care	Of babies born in 2011, 88% received prenatal care beginning in the first trimester	None identified	No, no project impacts identified
	Fetal alcohol syndrome	No vulnerabilities identified	None identified	No, no project impacts identified
	Low birth weight	Low birth weight rate was 7% in 2011	Air quality may impact low birth weight	Yes. Low birth weight was included in search terms for environmental hazard literature searches.
	Maternal Age	Zero births to women <20 years old, 47% of births were to women 35+ in 2011	None identified	No, no project impacts identified

Appendix C

Response to Public and Peer Review Comments

Appendix C-1

Response to Public Comments on Reissued Draft HIA

APPENDIX C-1: RESPONSE TO PUBLIC COMMENTS ON REISSUED DRAFT HIA

Comment	Commenter	Response
Please understand that these reports seem to be very "generic" and do not take into consideration the type of city and lifestyle that the citizens of Hermosa Beach live. and citizens that live.	D Andrews	The type of city and lifestyle demographics of the citizenry of Hermosa Beach is an integral part of the report and assessment. The detail regarding type of city and lifestyle is begun in Section 1 under Project Introduction with the description of the City and the outdoor and activity opportunities afforded by the City. Attention to demographics and lifestyle is continued in Step 1 of the Assessment including the baseline community profile and was considered in each evaluation of determinant of health.
1. Why isn't the population density figured into any of the reports or analysis? 1. Hermosa Beach is in the 99th% in population density. The vast majority of the population is south of the pier where the drilling will occur. 2. This puts Hermosa Beach in the same percentile as New York City, Boston, and San Francisco. 3. Has any of the reports compared oil drilling to those densely populated areas with a set back of 160 feet and 30+ wells in 1.3 acres?	D Andrews	The commenter's concern regarding this Project's proximity to a densely populated area is acknowledged. Although the term population density is not used in the report, the fact that Hermosa Beach is a densely populated area is discussed. In section 1.2 Oil Development and Production Activities, other urban drilling sites in the Los Angeles Basin are discussed. Boston and San Francisco comparisons can be found in Section 6.6.1 Traffic and Health in the discussion of traffic volume and vehicle-pedestrian injury collisions. Population density and proximity to the site are also considered in each evaluation where appropriate.
2. Hermosa Beach has a walkability score of 82 it is the 3rd highest in the State of California. 1. It puts Hermosa Beach in the 99th% for walkability in the US right with New York and San Francisco. 2. Has any of the reports compared oil drilling to those cities with a set back of 160 feet and even less feet to the sidewalk and greenbelt? 3. Has anyone looked at noise and air quality and how it will change the quality of a persons walk? 4. People walk to exercise and reduce stress, doesn't chemicals in the air, construction noise and traffic affect a persons health?	D Andrews	The commenter's concerns regarding walkability, noise, and air quality as well as the effect of exercise on a person's wellbeing are acknowledged. Regarding the comments about noise, please refer to the discussion in Section 5.5 Noise and Light. Regarding the comments about air quality, please refer to the discussion in Section 5.2 Air Quality Assessment. Regarding the comments about walkability and the effect of exercise on health, please refer to the discussion in Section 5.7.2 Community Resources: Access to Recreational Resources and Green Space. Regarding the comments about traffic, please refer to the discussion in Section 5.6 Traffic.
3. Hermosa Beach homes were designed to live with your windows open. 1. The weather is not too hot or cool. 2. We do not have air conditioners. 3. Has this report looked at densely populated homes that live	D Andrews	This comment provides statements to illustrate that the community lives in a climate where they leave windows open for the majority of the year. Opposition to use of blackout curtains and to running air conditioning are acknowledged. The recommendation that black-out blinds or curtains be provided is provided as an option to those who

Comment	Commenter	Response
with their windows open more than 9 months out of the year? 4. The suggestion of putting up blackout curtains up and alerting residents to noise as a solution is not one I see working. 5. I work from home and leave the windows open or it gets too hot. When a garbage truck goes by it is incredibly noisy when my windows are open! 6. Many homes in Hermosa Beach are old and have single pain windows is anything factored in for those types of homes and the noise levels? 7. If I have to use blackout curtains and keep my windows shut my house gets hot and I cannot sleep. Has sleep depravation because of heat factored into the hack solution of blackout curtains? 1. For those few homes that have A/C the cost of running A/C is expensive. It is an added cost on them. Has the stress of the financial burden for additional costs of running A/C been factored into the hack blackout curtain solution?		may desire it (so they don't have to pay for them themselves). We recognize that residents may prefer to maximize air flow at night and therefore chose not to request black-out blinds or curtains. As the recommendation is optional, we did not assess the financial stress of running air conditioning to facilitate the use of black-out blinds or curtains. This recommendation was based on the HIA Team's experience in rural areas that also tend to live with their windows open into which a new light source is introduced. The noise assessment considered outdoor noise levels, rather that noise levels indoor with the windows closed, and therefore noise through open windows is covered in the assessment.
4. People pay less to live near freeways because of sight, smell, and noise. The average home in Hermosa Beach is valued at over $1,000,000. The average home where the drilling is happening is valued at $1,400,000 at least. 1. The draft cost benefit analysis states that there could be at least a 10% reduction in home values. 2. Have you looked into the stress or any other health issue of someone who owns a home and have them lose $140,000 in equity? 3. Most people I know that lost $140,000 during the housing crisis were pretty stressed out. It seems like it is glossed over in your report.	D Andrews	Please refer to Section 5.7.1 for a discussion of the stress created by the fear of loss of value as well as stress created by loss of value itself.
5. Have you looked into the affects of a clean up of an oil spill and all of the ill effects on the citizens and the economy to compare Hermosa to cities along the gulf of Mexico? 1. People who cleaned up the spill and live in the area are having massive issues. 1. Watch "VICE" on HBO, they have many great case	D Andrews	There is no doubt that an oil spill – particularly one that reaches the ocean – could have a significant impact on the environment and economy of Hermosa Beach. The HIA looked specifically at the human health impacts that a spill to the ocean might have. The documented health effects from exposure to crude oil are discussed in Section 5.4.1 (Oil Spill). These effects include acute eye, throat, and skin irritation,

Comment	Commenter	Response
studies that shed some real light onto the issue. 2. The shrimp in the area have tumors and it is destroying their businesses. 3. The people have all kinds of serious medical issues.		as well as psychological impacts. The long-term impacts of the oil spill cleanup in the Gulf of Mexico are currently being studied; results have not yet been published.
6. Is the density of the well vs. the set back figured into this report? 1. Texas has a set back of 1,500 feet for drilling. You cannot be near homes, schools, parks, churches, businesses, etc... 2. They are obviously doing that for a reason. 3. The set back law is from 1932 and they are grandfathered into this set back law. 4. Seems a little strange that there are no effects found.	D Andrews	Regarding setbacks, the distance between the structures in the project and other items such as roads, property lines, sidewalks, etc. must be in accordance with the governing ordinances, zoning laws, or other agreements as legally mandated.
7. There is a mention of a 35 foot wall. 1. This will block people's view of the ocean. 2. Doesn't this cause your stress to elevate if you have a $1,000,000 home and will lose value because your ocean view is blocked?	D Andrews	The details regarding property values are outlined in Section 5.7.1 (Property Values) and the discussion of visual resources is included in Section 5.7.3 (Community Resources: Aesthetics and Visual Resources).
8. Can Intrinsik list any negative impacts from any reports that they have done with regards to oil drilling not just for this project but ANY projects they have done?	D Andrews	Please note that in this report the following are listed as negative impacts: periodic odor releases, oil spills, noise regarding pipeline construction Phase 3b, stress regarding property values, and aesthetic/visual resources. Intrinsik has over 25 years of experience in the environmental health field and Intrinsik has contributed to numerous assessments that have established that without mitigation or further risk management that adverse health effects could occur.
General overview comments: In my opinion, the “best” Health Impact Assessment (HIA) is one that objectively presents all the available information on a wide assortment of possible endpoints that might affect human health and prosperity, in a way accessible to the lay public, and does not take a position on the activity being evaluated. I do not think this document achieves that objective. The current HIA is written and presented with a decidedly pro-project perspective. The document is carefully worded to minimize potential opposition, maximize uncertainty with regard to reported health concerns, and literally lead the reader to the conclusion that all is well and the project can go forward with little worry. Discussions of potential health concerns, including exposure to air	E Avol	The HIA authors agree that HIAs should objectively present all the available information on potential impacts to public health due to a proposed project, in a way that is accessible to the public, and not take a position on the project being evaluated. The HIA authors took a neutral stance on the proposed Project and we believe the report reflects that neutrality. This was also acknowledged by the Peer Reviewer’s comments found in Appendix C. The commenter mentions the close proximity of the proposed Project Site to residential locations, schools, and recreational venues. The HIA report examined health impacts at both the neighborhood level (adjacent the Site) and the community level. The commenter’s opposition to the way the HIA is written is noted.

Comment	Commenter	Response
contaminants for which there are currently state or federal regulations (as in the case of air pollutants such as nitrogen dioxide, particle matter, hydrogen sulfide, some heavy metals and hydrocarbons associated with engine operations) have been carefully nuanced to shift public concern away from possible negative health outcomes. This may be an advantage to persuading the public to move forward with the project but does a disservice to providing information for evaluation. Other material, such as a discussion regarding the potential for ultra-fine particle exposure to nearby community residents, is missing, ostensibly because there is no regulation or state rule specifying that it be considered…but it does remain a potential exposure in close proximity to these industrial operations and could be of health importance. Oil drilling operations in such close proximity to residential locations, schools, and recreational venues is not ideal in terms of public safety and health nor the main approach typically utilized, so careful consideration of the assorted health and safety issues associated with the proposed project seem self-evident. From the work presented here, it is not clear that this document provides that level of public-perspective-oriented view.		
1. Pg27 of document (Pg 1 of report), Section 1.1, para1, second to last sentence: Comment is made about the popularity of outdoor activities. An additional observation is warranted, and it might read something like the following: "There is a popular wood chip jogging/walking ("Greenbelt") trail down the center of Valley/Ardmore Drives, one of the main transportation routes that traverses the entirety of the city of Hermosa Beach, connecting the city to its northern and southern beach city neighbors. It is regularly used by a diverse and substantial number of residents and visitors for exercise, outdoor enjoyment, and access/transport through the city and passes within ~150 feet of the City Maintenance Yard (the proposed site of drilling)."	E Avol	The comment suggests introducing the Greenbelt in Section 1.1 In response, the following text has been added to Section 1.1: "There is a popular wood chip jogging/walking trail (the "Greenbelt") running north-south along the center of Valley Drive and Ardmore Avenue, one of the main transportation routes that traverses the length of Hermosa Beach, and connecting the City to its northern and southern beach city neighbors. It is regularly used by residents and visitors for exercise, outdoor recreation, and active transport through the City." The proximity of the Site to the Greenbelt is addressed in Section 1.3.
2. Pg 51 of document (Pg 25 of report), Section 4.2.1, para 2, second sentence;"…Construction equipment and the vehicles that transport equipment can release fine particulate and diesel…" understates physical reality; through incomplete combustion, these	E Avol	The commenter's recommendation for wording changes is acknowledged, and the word "can" has been removed from the noted text.

Comment	Commenter	Response
engines DO release fine particles and diesel particulate. The only issue is how much is released to the surrounding environment.		
3. Pg 51 of document (Pg 25 of report), Section 4.2.1, para 2, last sentence – Similar to the comment immediately above, soil excavation and movement DO generate dust; this is not only a "possible" outcome, as the sentence is phrased.	E Avol	The commenter's recommendation for wording changes is acknowledged, and the word "can" has been removed from the noted text.
4. Pg52 of document, (p26 of report), para 2 – "…these effects are dose-dependent…". While it is true that there is typically an increasing human health response with increasing dose, it also should be noted that pollutant-response curves are not necessarily monotonically increasing; in other words, some pollutants do not have a simple linear response curve. There are also threshold effects for some pollutants, where there are no apparent effects up to a given concentration, and then some measurable and obvious health response presents itself. The overall phrasing in the current paragraph underplays the potential for health outcomes. For example, it is not clear why the last sentence in the paragraph ("the literature also identifies the potential impacts that odors can have on the quality of life, and at high enough levels, acute risks…" seems to avoid the possibility of chronic health outcomes associated with persistent low-level exposures to odors. While it is true that acute health effects can result, aren't longer-term effects possible as well? Human detection of odors represent one of several pathways of human exposure (this one via the respiratory pathway), and both chronic and acute effects might reasonably be expected.	E Avol	The commenter refers to text from Section 4.2.1 (Air Quality) within the scoping step. The purpose of the scoping step of the HIA is to provide the potential pathways between the project impacts and health outcomes. The detailed assessments of the pathways presented in the scoping section, and a more thorough discussion of threshold effects, are provided in Section 5.2 (Air Quality Assessment).
5. Pg 52 of document (p26 of report), second-to-last paragraph, first sentence ("…in the event that exposures were uncontrolled…"). This sentence misrepresents reality, since control of emissions does not mean "zero release of emissions" or "zero exposure". There will be gas and particle emissions associated with operations, and the question being considered is if these emissions are of significant health consequence.	E Avol	The HIA authors agree that the phrase "control of emissions" does not mean "zero release of emissions". It means the change in magnitude of the exposure.
6. Pg 52 of document (p26 of report), second-to-last paragraph, second sentence – It is unclear what meaning that the authors intend by the comment, "…this diagram…is a preliminary effect pathway	E Avol	The phrase "preliminary effect pathway" is explained in the next sentence in the same paragraph, where it is stated "The next step in the HIA is the assessment step, which validates or invalidates each

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diagram." Do they mean this is a draft figure that will be updated? The figure is, in fact, incomplete, since there are several other "air-quality related diseases" associated with ambient air changes in the air pollutants listed. These include effects on neurological outcomes (learning, attention, and behavior) and metabolic outcomes (on the pathway to diabetes and obesity outcomes). Presumably the "Reproductive Health" category includes premature birth, low birth weights, and even birth defects, as opposed to fertility issues, which many might consider Reproductive Health to represent. A broader discussion of these and other health outcomes are available in the USEPA Integrated Health Assessment documents for the respective pollutants, including particulate matter (PM) and Nitrogen Dioxide (NO2) , and these are posted at a USEPA website (http://www.epa.gov/ncea/isa/).		potential pathway." Regarding the health effects listed in the figure, please see Section 5.2 Air Quality Assessment for a detailed discussion regarding health effects from air quality, including nitrogen dioxide, particulate matter, toxic air contaminants, as well as odor.
7. Pg 52 of document (p26 of report), last paragraph concerning greenhouse gas emissions – This paragraph implies that since the authors of the report don't believe that any local project can affect world-wide emissions, discussion or consideration of the issue can be ignored. While it may (or may not) be true that the incremental contribution of greenhouse gas (GHG) emissions from any specific project may be small compared to the global issue, there almost certainly will be emissions from this project that are rightfully considered in the GHG category. These include (but are not limited to) carbon dioxide, methane, and carbon particles. Estimates of the quantities of these constituent contributions to the local community could be useful in evaluating the overall health impact of the project, and for that reason, dismissal of any GHG emissions discussion seems inappropriate.	E Avol	The HIA states that "the global issue of greenhouse gas generation requires a much broader assessment of state and national sources and policies to adequately evaluate cumulative impacts of the energy sector." Please note that it is stating that the issue requires a broader assessment to be addressed adequately. The HIA authors did not imply that there will not be greenhouse gas (GHG) emissions from the proposed Project. Please refer to the Final EIR for the estimates of quantities of GHG contributions from the proposed Project.
8. Figure 4-3, Air Quality Pathway Diagram (p53 of document, p27 or report) – Arguably the only portion of this diagram that is in question is the health outcomes listings boxes, in light blue on the far right of the diagram. There is no question that Construction, truck traffic, and site operations will respectively result in construction equipment/activities, changes in on-road vehicle traffic, fugitive emissions, and routine /emergency flaring events. These, in turn, will undeniably change ambient levels of air pollutants, odors, and hydrogen sulfide; whether those changes are measurable or captured	E Avol	The HIA authors agree with the commenter's statement and those issues are addressed in Section 5.2 Air Quality Assessment

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in the monitoring record is another matter, but they will change.		
9. Pg 54 of document (p28 of report, last paragraph, first sentence – Similar to a previous comment (Item #5 above), the comment here regarding soil pathways misrepresents reality; the re-entrainment and dispersal of some soil associated construction and trucking operations is inescapable. The issue is whether the amount that is released is sufficient to elicit measurable changes in soil quality or health outcomes.	E Avol	Regarding the soil pathways represented in this scoping step, please see Section 5.3.2 Soil Particulates for a detailed discussion regarding health effects from soil emissions.
10. Figure 4-4, Water and Soil Quality Pathway Diagram – the posted Note on the figure is inaccurate, since changes in surface water and soil quality are not really "health determinants", but rather, specific environmental pathway components. Health determinants are more generally agreed to be elements like policies, social factors, health services, individual behavior, and individual biology and genetics. More about this can be found in a discussion of Healthy People 2020, at http://www.healthypeople.gov/2020/about/DOHAbout.aspx	E Avol	The HIA authors acknowledge the commenter's reference to Healthy People and the definition contained therein. The HIA defines health determinant as "an element of the proposed Project that has the potential to impact health in a positive or negative manner" (see Section 2.4). This definition is consistent with those provided by the World Health Organization and the United States Centers for Disease Control and Prevention: http://www.who.int/hia/evidence/doh/en/ http://www.cdc.gov/socialdeterminants/Definitions.html
11. Pg58 of document, p32 of report, Section 4.2.4 Noise and Light, first paragraph, 4th line refers to "…very high levels…" of noise being associated with hypertension, cardiovascular disease, and cognitive impairment. While this may be true, the current presentation does not acknowledge that noise at levels other than "very high" (which is not defined in the passage) have been associated with negative health outcomes in published peer-reviewed studies (see, for example Gan et al, "Association of long-term exposure to community noise and traffic-related air pollution with coronary heart disease mortality", Am J of Epidemiol (2012) 175 (9): 898-96; http://aje.oxfordjournals.org/content/175/9/898.long.	E Avol	Please refer to Section 5.5.1 Noise Emissions for a discussion of noise levels and health outcomes.
12. Pg59 of document, p33 of report, Figure 4-6 – why is a change in outdoor lighting listed as leading to a possible change in "perception of safety" as opposed to " actual safety". The current phrasing makes it sound as if the issue is only one of perception, and not of actual physical harm, which is an incorrect and premature conclusion at this point in time.	E Avol	The commenter's recommendation for addition of the word "safety" is acknowledged, and the word "safety" has been added to Figure 4-6.
13. Pg60 of document, p34 of report, Section 4.2.5 Traffic, paragraph 3, line 3 – as noted previously, the phrasing used to	E Avol	The commenter is referring to the text along with the scoping figures and the HIA authors agree that a mitigated situation does not mean

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introduce each of these figures implies that the figures represent situations "…in the event that exposures were uncontrolled." This is incorrect, in that even with mitigation, some of these changes will occur, need to be quantified, and a determination will need to be made as to the severity of the outcome…but it is NOT the case that these issues will somehow disappear in the face of any, many, or perhaps even all feasible controls applied.		that no change will occur.
14. Pg61 of document, p35 of report, Figure 4-7 – The figure is incomplete and partially incorrect: a. If the figure is including a change in "safe walk" school path as a project impact, it should also include a change in community use of the belt adjacent to the construction location; b. If the figure is including a linkage between change in perceived safety and mental health/ physical activity outcomes, there should also be arrows linking changes in noise and air quality to changes in mental health, physical activity, and chronic disease; c. The listed "health determinant" of change in perceived safety is a biased and incorrect presentation ; at this point in time, the figure should present this as a change in safety (i.e., it is not just a perception of change); d. As previously noted in Item #10 above, this figure identifies "health determinants" incorrectly, or at least, uses the terminology in a fashion different from more general convention. e. The listed chronic diseases in the bottom health outcomes box are fine as examples, but do not cover the breadth of negative chronic health outcomes we have information about (and hypertension might be argued to be a sub-category of cardiovascular disease). This box should be modified to either list a few chronic diseases as examples (e.g.…), or include several others (respiratory, neurological, …)	E Avol	The commenter's recommendation for linkage in figure between noise and air quality to mental health, physical activity, and chronic disease is acknowledged, and pathways have been added to Figure 4-7. Please refer to above discussion regarding the definition of determinant of health. For a detailed discussion regarding health outcomes from changes in traffic related to this Project, please refer to Section 5.6.
15. Pg63 of document, pg37 of report, Figure 4-8 Community Livability – under project impacts, does increased wear and tear on city road surfaces (requiring more frequent road maintenance) due to heavy truck usage merit a box of its own, perhaps as "change in city infrastructure durability, costs"?	E Avol	Please refer to the Cost Benefit Analysis and Environmental Impact Report for more information regarding need for increased road maintenance and associated costs.
16. Pg65 of document, pg39 of report, Section 5.1.1 Demographic	E Avol	By comparing demographic characteristics in Hermosa to those in Los

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Characteristics – It is not entirely clear that the appropriate comparison for assessing demographics in Hermosa Beach is Los Angeles County, which covers a much broader and diverse geographic and sociological breadth. Perhaps comparing Hermosa Beach to other neighboring beach cities in the South Bay (Redondo, Manhattan, El Segundo, Marina Del Rey, Playa Del Rey, Venice, Santa Monica) would be more relevant to the local region?		Angeles County, we were able to provide a relative picture of demographic characteristics compared to a larger population (See Appendix E).
17. Pg66 of document, pg 40 of report, last paragraph, last sentence discussing birth profiles in Hermosa Beach and vulnerability to autism or Down's syndrome – this may well be, but it's not clear if the comparison being made takes into account the age distribution in Hermosa Beach compared to California, or if the comparison is just an arithmetic accounting without age distribution adjustment.	E Avol	The paragraph on birth profiles is clarified by defining that the comparison between birth profiles is not age-adjusted and therefore difference in age distribution may explain some of the difference in maternal age.
18. Pg67 of document, pg 41 of report, first paragraph on traffic-related injuries – how does the population –adjusted injury rate in Hermosa Beach compare to the County or state? Does this say anything informative about traffic safety in the area?	E Avol	The data on traffic-related injury illustrates that pedestrians and bicyclists are more likely to suffer from injuries when involved in a motor-vehicle collision in Hermosa when compared to injuries among motorists or vehicle passengers. See Appendix E Section 1.3.5 for additional information about traffic safety in the area.
19. Pg68 of document, pg42 of report, Section 5.1.5 Discussion of Vulnerable and Sensitive Populations, last paragraph, final sentence – This paragraph and sentence may be true within the pre-project scenario, but it could also be that the changes induced by the oil drilling within the city lead young professionals to seek living accommodations elsewhere (community comments about stress and property value concerns have already been noted, for example), so the paragraph as written does not really provide much in the way of any objective assessment.	E Avol	The purpose of the paragraph was an assessment for the potential for an increase or shift towards new populations over the course of the 35 year life of the project. The comment that the project itself could change the demographics of the community is acknowledged and the final sentence of the paragraph has been removed.
20. Pg69 of document, pg43 of report, section 5.2.1.1 NO2 and health, first paragraph – NO2 exposures have also been associated with low lung function or slowed lung function growth in children (Urman et al, Associations of children's lung function with ambient air pollution: joint effects of regional and near-roadway pollutants, Thorax, 69(6):540—7 (2014), http://thorax.bmj.com/content/69/6/540.long;. Additionally, it is important to point out that the effects seen are found among both asthmatic and non-asthmatic children (Berhane et al, Longitudinal	E Avol	We feel that Section 5.2.1.1 adequately addresses the effect of NO2 on lung function. The HIA authors do not feel that there is sufficient evidence in the literature to state that exposure to ambient NO2 can result in respiratory effects among non-asthmatic children. The Berhane et al. reference does not provide sufficient evidence for causality between NO2 and respiratory effects among both asthmatic and non-asthmatic children, as the study measures a potentially useful biomarker for

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effects of air pollution on exhaled nitric oxide: the Children's Health Study, Occup Environ Med, 71(7):507-13 (2014), http://oem.bmj.com/content/71/7/507.long.		airway inflammation, which may or may not be associated with actual airway inflammation among children.
21. Pg70 of document, pg44 of report, second paragraph, last sentence "…a recent meta-analysis…suggests…no evidence that NO2 causes clinical relevant effects in asthmatics at concentrations up to 1,100ug/m3 (585 ppb)." – This comment is accurate in its reporting of what the article stated, but the article misrepresents the current state of knowledge regarding NO2 and its effects on health. The next sentence in the HIA itself points out that the World Health Organization set a one-hour guideline for NO2 at less than 20% of the level argued by Goodman et al as being of health consequence. A recent search of the medical literature (using PubMed and the search terms "NO2 health") identified over 1300 citations documenting the effects of NO2 on respiratory, congenital, cardiovascular, cognitive function, and psychomotor development, to name just a few target organ systems. The USEPA science review of the available evidence addressing NO2 and health, which led to EPA's tightening of the National Ambient Air Quality Standard for NO2 (instituting a one-hour standard of 100ppb, in addition to the existing annual standard of 53ppb) and the directive to monitor close to busy roadways due to increased concerns about exposure and health, listed hundreds of studies showing increased effects. For example, a summary of the short-term (acute) effects for several health outcomes is shown in the attached figure entitled, "Figure 5.3.1, Summary of epidemiologic studies examining short-term exposure to ambient NO2 and respiratory outcomes." (This figure was taken from the USEPA Integrated Science Assessment for Nitrogen Oxides, EPA/600/R-08/071, July 2008, http://cfpub.epa.gov/ncea/cfm/recordisplay.cfm?deid=194645). The line in the figure, at a risk ratio of 1.0, represents no excess risk (which can be thought of as no measurable impact on health). The preponderance of plotted lines above 1.0 suggests that the studies cited (listed on the sheet accompanying the figure and cited more completely in the EPA document) all showed increased risk – that is, a measure of health effect as a result of exposure to NO2. The current	E Avol	We feel that Section 5.2.1.1 accurately characterizes the current public health literature on NO2. The USEPA science review on NO2 (2008) is cited several times in this Section, as is the USEPA 1 hour NAAQS of 100 ppb. Text has been added to Section 5.2.1.1 to indicate that in the 2008 EPA NAAQS review of NO2, it was noted that "…there was little evidence of an effect threshold…".

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National Ambient Air Quality Standards (NAAQS) review for nitrogen dioxide is presently underway, but a draft initial assessment, available at the USEPA website (http://cfpub.epa.gov/ncea/isa/recordisplay.cfm?deid=259167#Download) suggests that additional data available from recently-published studies (within the past four years) strengthen many of the earlier observations and concerns about NO2 and both short and long-term effects. Additionally, it should be noted (which the HIA does not) that in the 2008 EPA NAAQS review of NO2, it was noted that "…there was little evidence of an effect threshold…". This means that the data do not support the identification of any objective value or level below which no health effects would be expected. More recent studies have reported delayed psychomotor development in children at very young ages and very nominal changes in NO2 concentration (http://www.ncbi.nlm.nih.gov/ pubmed/24631606, http://www.ncbi.nlm.nih.gov/pubmed/25036432) Therefore, the implication in the HIA that there are only mild effects or too much uncertainty to be confident about health concerns at the levels encountered in daily activities is misleading.		
22. Pg70 of document, pg44 of report, fourth paragraph, last sentence, "the annual standard was upheld due to the uncertainty with the potential long-term effects of NO2." This phrasing of the statement is misleading. The data reviewed by the EPA in the last NAAQS review led the Administrator to set a one-hour standard of 100ppb NO2, based on concern that the annual standard of 53ppb was considered to be insufficient to protect the public health. The "…uncertainty with the potential long-term effects of NO2…" did not have to do with observed health effects, of which there were several from a number of studies. The "uncertainty" had to do with the high correlation of NO2 effects with other components of motor vehicle exhaust, meaning it was difficult to separate out the unique effects of NO2 from the other constituents of the exhaust. In the context of the current HIA, the ability to uniquely separate and apportion NO2 effects from other vehicle exhaust effects may be unimportant,	E Avol	Text has been added to reflect that the uncertainty with potential long-term effects of NO2, in the case of respiratory morbidity, is due to the high correlation among traffic pollutants which makes it difficult to accurately estimate the independent effects of NO2 in long-term exposure studies.

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because it vehicle emissions (coming from engine operations – i.e., gasoline and diesel exhaust -- associated with drilling activities will be a key source of exposure to the surrounding community.		
23. Pg71 of document, pg45 of report, Table 5-2 – the perspective and narrative of this table is focused on acute (short-term) exposures, with a recurring observation regarding variability among studies, inconsistencies among responses, and a general attempt to minimize observed responses (which seems counter to a true health assessment, which should be objectively presenting all the potential health risk information in ways accessible to the public). The exposure likely to be encountered if the drilling project goes forward are arguably more likely to be longer-term, low-level exposures for the immediate community, and the health effects for those sorts of longer-term (days, weeks, months, years) types of exposure are also available in published reports. They include a range of organ effects including: cardiovascular [affecting blood pressure, heart-rate variability, even cardiac events]; respiratory [low lung function in children, more asthmatic events in children, more risk for asthma symptoms]; neuro-developmental [less focus and ability to perform learning tasks cognitive function testing lags in both young children and older adults]); reproductive [pre-natal, low-birth weight, premature birth, birth defects]. These effects have been reported in the range of changing levels of ambient pollution possible with the proposed level of operations and should not be ignored or discounted because they are "chronic" or long-term exposure concerns. The duration of the proposed phased drilling efforts make these "long-term" exposures relevant and potentially of importance.	E Avol	The focus of Table 5-2 is on acute NO2 exposure because short-term exposure studies provide more conclusive evidence for adverse health effects compared to long-term exposure studies. The HIA does assess long-term or chronic exposures through a comparison of the maximum predicted air concentration to the WHO annual air quality guideline (0.023 ppm).
24. P73 of document, pg47 of report, Table 5-4 and subsequent two paragraphs – the tenor of the discussion and working assumptions of the presentation are that all mitigation strategies will operate perfectly, and that there will be no ambient exposures any health or environmental concern. This is optimistic, at best, and potentially unrealistic. The "no substantial effect" classification seems mis-assigned and premature.	E Avol	The Applicant has indicated that they will comply with the mitigation measures, made part of the development agreement, and therefore the HIA has made that assumption in its analysis. In addition, the scenarios that were evaluated are predicated on the fact that the emissions levels and limits will be governed by permits and approvals. If operations were to occur outside of these permitted levels then regulatory action would be taken.
25. Pg79 of document, pg53 of report, first paragraph concluding project emission are not expected to be high enough to exacerbate health risks in the community – this conclusion seems at odds with	E Avol	Because the Project emissions will not have a material impact on existing PM2.5 levels, the HIA authors conclude that PM2.5 emissions from the project will not exacerbate health risks to the community. We

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several of the previous comments presented in the text. At the top of pg75 of document, pg49 of report, quotation just prior to Section 5.2.2.2, there is a statement acknowledging that there are no identified thresholds for PM exposures (in other words, no safe level of exposure that will protect every individual). The text goes on to present comparative monitoring information for reporting stations in the South Bay (used as a surrogate for Hermosa Beach because no regional monitoring station is located in Hermosa Beach) and reports that observed levels are just below the State or WHO standards, so no effects are anticipated. This conclusion implies a threshold-of-effect interpretation, which is incorrect. Based on the data presented, there will be a potential for effects in some susceptible sub-groups of the community population – most likely, among pregnant mothers and young children.		do not believe this conclusion to be at odds with no identified threshold for PM2.5 exposure, and the commenter's views in opposition of this are acknowledged.
26. P89 of document, pg63 of report, last paragraph summarizing likely health outcomes – the second-to-last sentence refers to 'odor-sensitive" individuals as being the vulnerable population, and seems to imply that this is a small segment of the population, and possibly unimportant. Previously, in the text, however (p86 of document, pg60 of report, last paragraph), it is noted that 50% of the population can detect 8ppb H2S, so it seems like the comment about "odor-sensitive vulnerables" and the implication that this is somehow a small portion of the population is misleading.	E Avol	The HIA authors did not intend to imply that odor sensitive individuals are a small part of the population nor did we intend to downplay the importance of odor. "Odor sensitive individuals" often include women who have a keener sense of smell than men and younger individuals who tend to have a keener sense of smell than the elderly.
27. P95 of document, p69 of report, last paragraph of previous page and first paragraph or this one, (last portions of Section 5.3.1.3, Project Impact for Surface Water – the conclusions (throughout this report, actually) that "no substantial effects" will occur because preventive measures will be implemented, strain credulity, since it does not allow for upset conditions, human failures, or accidental lapses. The observation that since people can swim elsewhere, there is inherent adaptability to possible changes in the local environment should not be considered an acceptable response or useful input for community planning.	E Avol	The Applicant has indicated that they will comply with the mitigation measures, made part of the development agreement, and therefore the HIA has made that assumption in its analysis. The commenter's views in opposition of this assumption are acknowledged. The observation that people can avoid swimming near the storm drain was followed by the observation that people may not be aware of its location (and therefore adaptability is categorized as "medium" rather than "high").
28. P96 of document, p70 of report, Table 5-17,Water and Soil Quality Assessment, Soil Particulates – Once again, a potential exposure is identified (in this case, wind-blown dust), but as in other previous presentations within this HIA, the likelihood of event is	E Avol	The Applicant has indicated that they will comply with the mitigation measures, made part of the development agreement, and therefore the HIA has made that assumption in its analysis. The commenter's views in opposition of this assumption are acknowledged.

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minimized and "no substantial effect/no additional measures required" conclusions are reached. Construction operations, and access and egress to and from the site will almost certainly create wind-blown dust. Denial of this occurrence defies logic. Complete assurance of flawless application of mitigation approaches also seems to strain credibility. The observation that contaminated soil exists at the site due to prior activities does not excuse or minimize the responsibilities of the proponents of proposed operations at the site from managing and controlling site emissions.		Any remediation of the impacted site would be governed by best-practices and overseen by the responsible authority. This is how impacted sites are safely remediated in California every day.
29. P98 of document, pg72 of report, last paragraph (continuing onto next page) – the comment that people present at the time of an oil spill would be unlikely to experience health effects other than minor and transient effects minimizes the potential risk to those in the immediate vicinity and ignores historical events in the past. If previous historical oil spills had always only resulted in no other "health effects other than minor, transient…" ones, the regulatory and public focus on these types of drilling activities would be considerably different. This interpretation and presentation unfairly dismisses the potential for such an event and the potential health outcomes associated with such events.	E Avol	As stated in the HIA, with exception of psychological impacts, the long-term health effects of oil spills have not been well-studied. In the wake of the BP Deepwater Horizon disaster, the National Institute of Environmental Health Sciences (NIEHS) has launched the largest study ever on the health consequences of oil spill cleanup, focusing especially on respiratory, neurological, and hematological outcomes. Depending on the results of this ongoing study, this section of the HIA may require updating in the future. Information on the study can be found online: https://gulfstudy.nih.gov/en/index.html
30. P101, of document, p74 of report, first paragraph, last sentence proclaiming that an emergency preparedness plan for the community is the duty of the City- this may be specifically accurate, but since the actuating event would be associated with drilling operations, doesn't some responsibility for planning, guidance, and/or support for effective emergency plans lie with the site operations team as well? It seems like noting that "it is the responsibility of the City…" is not a responsible or useful way to address this issue.	E Avol	The HIA states that the facility is required by regulation to have emergency response plans in place. The preparation of a community emergency preparedness plan is an additional recommendation for the City to consider, as the existing Emergency Preparedness Advisory Board is already committed to providing advice on how the City can prepare and respond swiftly to emergencies.
31. P103 of document, pg77 of report, paragraphs describing likelihood and responsibility for well blowouts – How does the safety record of the applicant (E&B) compare to the industry norm? Do their well drilling operations have a better, equal, or worse record, in terms of spills, leaks, or problems? The section defines a blowout as "unlikely" since such events are very low probability events, but how do the frequencies quoted (once every 323 years during drilling) compare to their own company history?	E Avol	The HIA relied on information provided in the EIR when describing the likelihood and impact of a well blowout scenario. Please see the EIR for additional information on how the figures were determined.

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32. Pg155 of document, p129 of report, first paragraph (last section of 5.6.5.3, discussing impact of proposed project on green space) – the text discusses changes in the area associated with the project, including construction, increased truck traffic, etc, acknowledges that the Greenbelt is within 55 feet of the project area and is regularly used by the community – and then suggests that increased city revenues as a result of the project would be a positive outcome for green space, so that the post-mitigation effect is positive, and a community group should be established to decide how to spend the anticipated revenue. This perspective of minimizing the impact while emphasizing the potential for monetary income seems misplaced and not in the best interests of an impartial HIA. Local green space (the Greenbelt) will likely be affected by the construction and truck transportation activities, and shifting focus to potential monetary gains that might be available for future use seems cynical and inappropriate.	E Avol	The HIA addresses the impact to the Greenbelt due to construction and truck traffic activities in Section 5.6.2. The Section regarding "Access to Recreational Resources and Green Space" considers how the proposed Project may impact recreational resources (associated with physical activity and other positive health benefits) used throughout the community. The commenter's disapproval of evaluating financial benefits to the City in the HIA is acknowledged.
33. P171 of document, p145 of report, first paragraph (beginning on previous page) describing project impact on community social cohesion – the HIA concludes that there is no substantial effect of the project on social cohesion, yet the signs across the city, letters to the local papers, street discussions, and social media postings would decidedly suggest otherwise. Although it is difficult to envision what measures might be undertaken to address this concern, it does seem apparent that there are strong feelings and considerable anxiety, on both sides of the issue, across the community, and how these get resolved remains to be seen…although the forthcoming election will obviously be a benchmark in the discussion.	E Avol	As stated in the social cohesion section of the HIA, although a subgroup of residents is expected to experience a disruption in social cohesion (leading to a potential increase in stress) as a result of the proposed Project, it is not anticipated to overall impact community health. Therefore, no recommendations were made to address an impact to social cohesion. The commenter's disagreement with the HIA findings is acknowledged.
How can anyone that lives in Hermosa Beach that claim that they love their city want this type of possibility looming? AND-for 35 years to come!!??? The rest of the report cites all kind of noise, lights being used at night for drilling, trucks in and out, unhealthy emissions, smells being emitted, possibility of oil spills into our ocean, and MORE. And no one seems sure if these emissions can cause cancer, health risks, or mental issues? Everyone seems to be rolling the dice, don't they? E&B says none of these disasters will occur**....**how do they know that there won't be a spill or cancer 20 years down the road to our citizens? Do	L Carter	The commenter's views in opposition to the proposed Project are acknowledged.

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they have some type of fancy crystal ball? And for what? MONEY?????? There is no amount of money that is worth the health of any of our citizens. If you have ever been sick, you know this. There is no amount of money worth oil on our beaches, the killing of our ocean life, and smelly air. If you love your beach, you know this too.		
There is no doubt that the proposed project will increase the amount of traffic, air pollution, noise pollution and light pollution in, and around, the city of Hermosa Beach. In addition to writing to you about these concerns, I will also add a dimension that is not covered in the NOP for the EIR. This project has already begun to create a threat to the citizens of Hermosa Beach that, in the psychological community, is known as an Existential Threat. Living with an existential threat brings concerns worthy of addition to the scope of this EIR and will also exacerbate the symptoms and ailments caused by the various forms of stress and pollution that will be created by this project being packed into such a densely packed community.	M Collins	The commenter's concern regarding potential negative impacts of the Project as well as existential threat and the possible psychological impact on the exposed population is acknowledged. Psychological impacts such as anxiety, depression, and stress are addressed throughout the report.
Air Pollution has been linked to cancer, brain damage, depression, forgetfulness, and learning and memory problems. It is paramount for the health and wellbeing of this community that we address the increased probability of this threat. I'm not certain of the threshold of acceptance that your study will utilize, but in this community's opinion, increasing the likelihood that one citizen be asked to suffer the symptoms of depression, or that one child struggle in school as a result of learning problems exacerbated by this threat, is an unacceptable threshold. There is an abundance of studies that you can reference that will scientifically support these facts. How will the increase in air pollution caused by this project increase the probability of cancer? How will the increase in air pollution caused by this project increase the probability of brain damage? How will the increase in air pollution caused by this project increase the probability of depression?	M Collins	Please refer to the detailed assessment of air quality in Section 5.2 of the report.

Comment	Commenter	Response
How will the increase in air pollution caused by this project increase the probability of increased forgetfulness? How will the increase in air pollution caused by this project increase the probability of a child developing learning or memory problems? How will the increase in air pollution caused by this project increase the probability of an increase to the suicide rate in the community?		
Noise Pollution has been linked to impaired cognitive function, reading comprehension, long term memory problems, learning disabilities and problems with both attention and communication. Several studies point to an overall delay in cognitive development for children raised near noise pollution. The risk to our children's academic abilities is something that must be included in this study. An increase in noise pollution also creates higher levels of stress and anxiety. Stress and anxiety bring a host of physical and psychological struggles. Increases in weight, anger, violence, and substance abuse to ameliorate symptoms of anxiety are but a few. Then there is the obvious fact that the noise created by the project will absolutely affect people's ability to sleep. There are people in this community that sleep in the day and work through the night, and then there are the rest of us, that sleep at nighttime. When you measure the level of noise created by this project, will you use the real Hermosa Beach metric? Here in Hermosa Beach we live and sleep with our windows open. We spend time outdoors and in our community. Please utilize a metric that takes into account the way we truly live our lives. We do not hide behind blackout curtains and dual paned vinyl windows. We do not wrap our houses in blue soundproof blankets. We need you to use a metric that takes into account this obvious truth. Asking us to shutter ourselves in as a way to mitigate noise will only increase the likelihood of disturbed sleep, anxiety, depression and myriad other problems associated with noise pollution. How will the increase in noise pollution caused by this project increase the probability of impaired cognitive functioning in both children and adults?	M Collins	Please refer to the detailed assessment of noise in Section 5.5 of the report.

Comment	Commenter	Response
How will the increase in noise pollution caused by this project increase the probability of reading comprehension problems for school-aged children? How will the increase in noise pollution caused by this project increase the probability of long-term memory problems? How will the increase in noise pollution caused by this project increase the probability of a child developing a learning disability? How will the increase in noise pollution caused by this project increase the probability of a child developing attention problems? How will the increase in noise pollution caused by this project increase the probability of a child developing communication problems? How will the increase in noise pollution caused by this project increase the probability of citizens developing insomnia? How will the increase in noise pollution caused by this project increase the probability of citizens developing depression related to lack of sleep? How will the increase in noise pollution caused by this project increase the probability of citizens developing anxiety related to lack of sleep? How will increase in noise pollution caused by this project increase the probability of an increase in domestic violence? How will the increase in noise pollution caused by this project increase the probability of substance abuse directly caused by stress related to noise pollution, insomnia, depression or anxiety? How will the increase in noise pollution caused by this project increase the probability of an increase to the suicide rate in this		

Comment	Commenter	Response
community?		
Light Pollution has been shown to disrupt circadian rhythms, which will cause irregular sleep patterns and has been linked with a higher incidence of cancer. Fear of an increased likelihood of cancer is an obvious stressor and Existential Threat. There is an abundance of literature studying the relationship between disrupted sleep patterns and a higher incidence of stress, heart disease, cancer, depression, anxiety and poor school performance. The evidence is overwhelmingly in support of this cause and effect relationship. In addition to that, I am immediately worried that an increase of light around our community will interfere with our current sleep patterns. It would appear that there are thousands of residents that would be able to see an increase in light as a result of this project. If they can see it, this means that it is affecting them. This reality must be included as part of your metric. Will you enter several houses and study how the light of this project will enter our homes and neighborhoods? How will the increase in light pollution caused by this project increase the probability of cancer within the community? How will the increase in light pollution caused by this project increase the probability of disrupted circadian rhythms in sleeping citizens? How will the increase in light pollution caused by this project increase the probability of stress in the community? How will the increase in light pollution caused by this project increase the probability of heart disease as it relates to poor sleep? How will the increase in light pollution caused by this project increase the probability of depression as it related to poor sleep? How will the increase in light pollution caused by this project increase the probability of anxiety as it relates to poor sleep?	M Collins	Please refer to the detailed assessment of light in Section 5.5 of the report.

Comment	Commenter	Response
How will the increase in light pollution caused by this project increase the probability of poor school performance as it relates to disrupted sleep? How will the increase in light pollution caused by this project increase the probability of an increase to the suicide rate in this community?		
Existential Threats come in the obvious form of how a person deals with a threat upon their life. A person with a compromised immune system living by an oilfield would certainly have an increase in fear that their body would not be able to deal with an increased amount of stress or pollution. Existential Threats are also threats to family, wellness, lifestyle and community. There is also the psychological threat that our entire community is being asked to bear as a result of living under the existential threat that was levied upon us as a result of this issue being placed back on the table. Every single community member is operating with an increased concern that the outcome of this project will effect the way that we currently live and exist. Your study is to include health and safety risks. In my business, I see people day in and day out who are seeking treatment to deal with anxiety, depression substance abuse, relationship issues, school struggles, insomnia and learning disabilities. All of these issues are listed as byproducts of living near increases in Air, Noise and Light Pollution. They are also the direct result of living with an existential threat. How will the existential threat caused by this project increase the probability of anxiety within the community? How will the existential threat caused by this project increase the probability of depression within the community? How will the existential threat caused by this project increase the probability of substance abuse and dependence within the community? How will the existential threat caused by this project increase the	M Collins	The commenter's concern regarding existential threat is acknowledged. Upset Conditions were discussed in the report. Please refer to the Upset Conditions Event Pathway on page 31 as well as Section 5.4 which details information about upset conditions including psychological impacts such as anxiety, depression, and stress.

Comment	Commenter	Response
probability of relationship issues within the community? How will the existential threat caused by this project increase the probability of academic struggles within the children of this community? How will the existential threat caused by this project increase the probability of insomnia within the community? How will the existential threat caused by this project increase the probability of an increase in learning disabilities within the children of this community? How will the existential threat caused by this project increase the probability of an increase to the suicide rate in this community?		
Air, Noise and Light pollution will be a reality of this project. As you study these factors and then offer mitigation recommendations, will WE THE PEOPLE be asked to close our windows, move our beds, stay off of our patios and roof decks, raise the sound level of conversations with our friends, family and community or alter the route that our children walk to school. If the answer is yes, then the pressing reality is that this mitigation causes a threat to the way that We Exist. If the way that a community naturally exists is threatened, all of the above mentioned questions become scientifically backed realities that must be included in the EIR.	M Collins	Please refer to the detailed assessment of Community Livability in Section 5.7 of the report.
1. Positive Health Benefits There are several positive health benefits that are expected to accrue from the E&B project that seem to have been omitted from the report or presented in a way that does not show the strength of the positive effect. a. Lead removal. The HIA does not consider the potential positive health benefits of E&B's remediation of the existing lead-contaminated soil at the City Maintenance Yard site. Lead is a known hazard, especially for children, and the removal of contaminated soil by E&B constitutes a long-term benefit for the City and its residents. While we appreciate that the lead is currently capped in situ, the removal of lead at the	E&B	It is acknowledged that it is beneficial to remove lead which is present in a way that can result in human exposure. The lead is currently "capped in situ" along with other residual contamination from the former landfill. These contaminants become increasingly of concern with soil excavation and grading which mobilize contaminants. The soil excavation and grading required by the Project creates the pathway to human health impact and the necessity for remediation. Regardless, given that the contaminants are currently capped in place there is no net health benefit from the Project over baseline conditions. Section 4 (Scoping) describes the process for identifying priority

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site should be recognized. b. Municipal fire and hazard response capabilities. The mitigation measures for E&B's project include making funding available to upgrade current deficiencies in the fire department, including upgrading the dispatch system, ensuring HAZMAT trained personnel are available, and funding a new full-time Fire Marshal/Inspector. These measures will have a very real and positive effect on public safety and emergency response community wide. c. Education funding. Education funding is discussed on pages 139-142 of the HIA. However, as evidenced in the City Council workshop, it was not clear to some audience members that the additional education funding is not at the discretion of the City (as would be the use of revenues for green space amenities) but is a contractual requirement under the Lease. d. Increase in property values. The HIA considers the adverse impacts of a drop in property values for those proximate to the project site, but does not consider the fact that the substantial increase in City revenue from the project could improve services (municipal services, recreational opportunities, pension benefits, sewers, storm drains, etc.). These improvements could make the City more desirable and potentially increase property values as well as potentially result in public health and safety benefits.		health determinants of focus for the HIA. It was through this process that revenue to the City for education and recreational resources were selected for assessment in the HIA. The HIA authors acknowledge that the company has, and may continue, to offer what it believes to be positive benefits to the community. The magnitude and level of these benefits will ultimately be decided on by the community. Text has been added to Section 5.7.4 to clarify that education funding is a contractual requirement under the lease. The HIA relied on the information provided in the CBA with respect to Property Values. We found no information in the CBA that evaluated potential for increase in property values and hence it will not be included in the HIA.
2. Monitoring Program The HIA recommends the establishment of a health monitoring program, and E&B supports this idea, but any such monitoring program should consider the following factors. a. Selection of indicators. In the HIA, there are suggestions for several monitoring approaches that would be inappropriate for gauging the health effects of E&B's project, such as using health statistics that provide a comparison to the baseline health section and using data on "mortality, cancer rates, birth outcomes and others." Most of these health outcomes are multifactorial and are influenced by a very wide variety of genetic, behavioral, social, economic and environmental	E&B	The HIA authors agree that details of a monitoring program including the design of the program, indicators to be included, method of assessment, and timing of monitoring, etc. should be developed with input from stakeholders, the City and the Applicant. If the proposed Project moves forward, the City should work with the Applicant to initiate a monitoring program and hire the appropriate party to develop an appropriate scope of the study and conduct the monitoring. Text has been added to the HIA to describe how monitoring program should be developed.

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factors. If there is a change observed in the rates of cancer, asthma, etc., it would be enormously difficult to attribute the change to the project with any scientific rigor. We suggest using a suite of indicators that can more closely be tied to project activities, and that represent changes upstream of eventual health outcomes; for example, indicators of air quality, measured noise levels, municipal revenue devoted to various health-related programs or projects, etc. Similarly, while a Quality of Life study approach could be informative, the HIA proposes using the SF-36, which would be inappropriate to gauge project-related changes in overall Quality of Life, especially if the findings are not correlated with other factors that influence population health trends, such as the aging of the population or changes in economic status of the region. b. Timing. Any monitoring should commence before project-related construction begins to help minimize the likelihood of overestimating the impact of the project on various indicators. c. Design of the monitoring plan. In order to address the factors listed above, E&B proposes to work with the City to develop a health monitoring plan for the project. The health monitoring plan should specify not only what indicators should be tracked, but at what frequency and using what data sources, to whom the information will be reported and how transparency will be ensured, what comparison or control groups will be used, and how other societal, environmental or economic changes will be accounted for.		
8.0 CONCLUSIONS The HIA considered 17 determinants of health that fall under six major categories and were identified as community priorities. Additionally, consideration was given to those determinants that are most likely to be impacted by the proposed Project. Each of these outcomes was carefully assessed using a combination of quantitative,	T Fox	The commenter has concerns regarding the Project's negative influence on respiratory effects including asthma and other pulmonary diseases in vulnerable populations, specifically due to odor releases. The HIA authors believe that odors and the associated respiratory symptoms are adequately addressed in the report. Section 5.2.4.1 (Odor and Health) acknowledges that the health consequences

Comment	Commenter	Response
semi-quantitative and qualitative approaches where appropriate. Ultimately, the aim of the assessment was to determine whether the Project (post-mitigation) could potentially have a negative, positive or no substantial effect on the health of the community (Table 8-1). The following were the major findings for the six categories examined: **Air Quality** The air quality assessment within the HIA concludes that with implementation of the proposed EIR mitigation measures there is no substantial effect on human health with respect to air emissions (NO2, PM and TAC). However, periodic odor releases, identified in the EIR as significant and unavoidable, were characterized as negative near the Project Site. Odor can have various health consequences, and could result in periodic discomfort and annoyance near the Project Site. The Health Impact Assessment Draft states that "According to the census data for Hermosa Beach, approximately 25 percent of the population may be considered to be more vulnerable to certain environmental exposures, based on age (9% over the age of 65 and 16% under 18 years)." Both older and younger people are more prone to asthma and other pulmonary issues; In Los Angeles County, approximately 35% of people in that demographic listed above have asthma. For those of us with lung problems, periodic odor release could present a significant and potentially dangerous trigger for asthma and COPD. This needs to be seriously considered and evaluated. http://www.californiabreathing.org/asthma-data/county-asthma-profiles/los-angeles-county-asthma-profile		of odors can include symptoms of asthma exacerbation (chest tightness, shortness of breath, wheezing). The mechanism by which odors trigger asthma exacerbations is not very well understood but is thought to be a combination of psychological (stress) and physiological factors. The HIA discusses various psychological impacts of the proposed project throughout the report. Because of the health consequences of periodic odor releases, the HIA found a negative health effect from odors, even with EIR mitigation. In addition, respiratory issues including asthma were considered in detail in Section 5.2 Air Quality Assessment.
Water and Soil The water and soil quality assessment within the HIA concludes that with implementation of the proposed EIR mitigation measures, there is no substantial effect on human health with respect to surface water quality and soil particulates. **Upset Scenarios** In the oil spill assessment concludes there is no substantial effect	T Fox	The HIA authors agree that low probability is not the same as no possibility. As described in the HIA, if an oil spill were to occur, the most likely health outcomes would be acute and reversible. However, if a well blowout were to occur, health outcomes could include serious injuries and mortalities. Overall, the HIA found a negative effect related to the well blowout scenario.

Comment	Commenter	Response
with implementation of the proposed EIR mitigation measures. The blowout assessment within the HIA concludes that there is a low probability of occurrence, but in the event such upset conditions were to occur, they could have significant negative health implications. The HIA recommends that the City incorporate the possibility of an oil spill or well blowout into its current emergency preparedness plan. "Low probability of occurrence" still means that an oil spill is possible and if that were to happen, it would have significant health impact. The outcome of such a scenario should be completely explored and presented to the community prior to any action taken to proceed with this project.		
Noise and Light The noise assessment within the HIA concludes that, with implementation of the proposed EIR mitigation measures, there is no substantial effect on human health from Phase 1, 2, 3a (site construction) and 4, and a potential negative impact from pipeline construction activities in Phase 3b. Therefore, it is recommended that written notification be provided to residents and schools in the vicinity of these activities that identifies the potential for excess noise and outlines the location and duration of the impacts. The light assessment within the HIA concludes that, with implementation of the proposed EIR mitigation measures, there is no substantial effect on human health with respect to light emissions; however, there is potential for nearby individuals to experience disruption of typical sleep patterns. Therefore, it is recommended that black-out blinds /curtains be provided for residents whose bedroom window(s) are in the direct line-of-sight of the exposed portion of the electric drill rig to eliminate any infiltration of outdoor lighting. There is significant documentation on the negative health impact of sleep deprivation. In an affluent area where people have paid significant amounts for their homes, to suggest that an appropriate measure is to provide blackout curtains is totally unacceptable.	T Fox	The commenter's views in opposition to the proposed use of black out curtains are acknowledged. The recommendation that blackout blinds or curtains be provided is provided as an option to those who may desire it (so they don't have to pay for them themselves). We recognize that residents may prefer to maximize air flow at night and therefore chose not to request blackout blinds or curtains.

Comment	Commenter	Response
Traffic The traffic assessment within the HIA concludes that, with implementation of the proposed EIR mitigation measures, there is no substantial effect on human health with respect to traffic safety and perceived traffic safety hazards. **Community Livability** The community livability assessment within the HIA concludes that with implementation of the proposed EIR mitigation measures there is: no substantial effect on human health with respect to social cohesion; a potential negative effect from stress over property values, aesthetic/visual resources; and a potential positive effect on health from enhanced recreation and green space, educational funding and political involvement activities. This flies in the face of Hermosa's intention to be a "Southern California's Greenest City" and its stated goal to have zero carbon emissions.	T Fox	The commenter's views in opposition to projects with carbon emissions are acknowledged.
Overall Conclusion There is no simple answer to the potential impact that the Project will have on the health of Hermosa Beach residents since different aspects of the proposed Project will impact the community in different ways. We caution that the assessment and conclusions are based on population health and not on single individuals. There are a number of aspects of the Project that may positively influence health (e.g., increased education funding, ability to enhance green space), and at the same time there were potential negative health outcomes identified (e.g., odor, blowouts, property values). With the exception of accidents, the negative health outcomes were largely nuisance related (e.g., odor, aesthetics) without irreversible health impacts. The majority of the health determinants examined revealed that the Project (post-mitigation) would have no substantial effect on the health of the community. In Los Angeles County, 23% of children from ages 1 to 17 and 12% of adults over age 65 have asthma. Asthma is a potentially fatal disease. Given that 25% of Hermosa's demographics fall within that category,	T Fox	The HIA authors acknowledge the commenter's concern regarding the Project's negative influence on respiratory effects including asthma and other pulmonary diseases in vulnerable populations. The HIA authors believe that odors and the associated respiratory symptoms are adequately addressed in the report. Section 5.2.4.1 (Odor and Health) acknowledges that the health consequences of odors can include symptoms of asthma exacerbation (chest tightness, shortness of breath, wheezing). The mechanism by which odors trigger asthma exacerbations is not very well understood but is thought to be a combination of psychological (stress) and physiological factors. The HIA discusses various psychological impacts of the proposed project throughout the report. Because of the health consequences of periodic odor releases, the HIA found a negative health effect from odors, even with EIR mitigation. In addition, respiratory issues including asthma were considered in detail in Section 5.2 Air Quality Assessment.

Comment	Commenter	Response
I think that *anything* that has the potential to impact lung disease--whether specifically from irritating particulates or indirectly from "periodic odor releases" --- should be seriously considered as having health impact. In my opinion, this report minimizes the impact on lung disease and should be revised to include potential impact on asthma and COPD. http://www.californiabreathing.org/asthma-data/county-asthma-profiles/los-angeles-county-asthma-profile Please note that the Health Impact report states the following: • According to the census data for Hermosa Beach, approximately 25 percent of the population may be considered to be more vulnerable to certain environmental exposures, based on age (9% over the age of 65 and 16% under 18 years).		
The assessment states that the pollution levels are already above levels that can cause cancer, so why should we allow drilling in our environment that would increase the pollution further, even incrementally?	C Furnberg	The commenter's opposition to any project that would results in emission of air pollutants into the air shed is acknowledged.
I am concerned about the absence of specific information in the reissued draft that pertains to me, my family and my neighbors. I live approximately 500 feet from the drilling site, am pregnant, and by the time this project begins will have one or more small children. Accordingly, I assume that my family and I fall into the "vulnerable population" for most of the categories discussed in the HIA. However, the HIA fails to provide a definition for "vulnerable population," so I am forced to speculate as to whether I am part of that population. All the HIA tells me is that vulnerable populations "may be disproportionately affected by the project." Each health determinant evaluation matrix identifies a "vulnerable population," but stops there. The reissued draft does not explain how that population will be affected, nor does it provide a specific explanation of who falls into that vulnerable population. One example of a "vulnerable population" that requires more explanation is in Table 5-19 "Upset Scenario." The reissued draft identifies the vulnerable population as "people in immediate vicinity." What radius constitutes the immediate vicinity? Does this mean immediate	J Hamill	The commenter's concern regarding her family, her small children, and her risk from the Project given that her family lives 500 feet from the site are acknowledged. Vulnerable populations are defined in the HIA as "populations that could be disproportionately affected by Project activities". Increased vulnerability depends on the health determinant. In general, age (i.e., age<18 and age>65) is an important factor for determining vulnerability. Factors such as pre-existing disease, pregnancy, and genetics can also influence vulnerability to adverse health outcomes. The health effects associated with vulnerable populations are the same health outcomes examined for the population in general in the case of each health determinant assessed in the HIA. The difference being that vulnerable populations are at increased risk compared to the general population (children are more vulnerable to traffic injury because of slower reaction times and drivers are less likely to notice a small child). For the well blowout scenario, the EIR estimated that offsite fatalities

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vicinity of the drill site, the pipelines, or what? I would like to know how many people are in the "vulnerable population" for each health determinant identified. I would also like to know what health effects the "vulnerable population" can expect to experience. The reissued draft does not provide that information. Its conclusions appear to be the health effects that the "non-vulnerable" population may expect to experience in a best case scenario.		and injuries could occur as far away as 300 and 750 feet, respectively from the Project Site (Figure 4.8-5; MRS, 2014). Text has been added to Table 5-19 to clarify that immediate vicinity is defined as 750 feet, in the case of a well blowout. The exact number of people that represent a vulnerable population for each health determinant was not available to the HIA team and represents an information gap in the HIA.
The result is laughable and untrustworthy "post-mitigation health effects." For example, Table 5- 18 describes a Crude Oil Spill Upset Scenario. Through the use of the "novel" evaluation matrix, the reissued draft concludes that there is "no substantial health effect" from a crude oil spill, while admitting that the possibility of a spill occurring is not possible to mitigate completely. I am no scientist, but I believe a crude oil spill would result in a substantial health effect.	J Hamill	The commenter's views in opposition to the conclusion of "no substantial health effect" from a crude oil spill are acknowledged.
Another laughable item in the reissued draft is the suggestion that individuals in the direct line of site of the drill rig be provided with blackout curtains to eliminate the potential for infiltration of light emissions from the nighttime lighting on the drill rig. If I wasn't living so close to the project site, I might find this funny. Instead, I find it ridiculous and deeply disturbing.	J Hamill	The commenter's views in opposition to use of blackout curtains are acknowledged. The recommendation that blackout blinds or curtains be provided is provided as an option to those who may desire it (so they don't have to pay for them themselves). We recognize that residents may prefer to maximize air flow at night and therefore chose not to request blackout blinds or curtains.
Due to the serious potential adverse health impacts described in the original draft health impact assessment, I feel that my family and I deserve to know exactly what we can expect from this project, and we deserve to have it explained in terms that we understand. Washing over it and dismissing us as a "vulnerable population," without explaining what that means for our health, is simply not enough. I am concerned about the 180 degree turn from the conclusions in the original draft, attached as Exhibit A, from the conclusions in the reissued draft. I created the table at the end of this letter to show the dramatic difference between the conclusions in each draft. The rationale for the reissuance is: "The February draft RIA was largely	J Hamill	The commenter's views in opposition to the reissued report's conclusion are acknowledged. The HIA authors do not believe that the information was reported in a manner which could be interpreted as dismissive and strived to present the information in a way that could be easily understood by the public. Please refer to the above response to comment about concerns regarding vulnerable populations for additional information regarding the meaning of that term. It was the decision of the HIA consultants to request that the City retract the initial draft HIA. While the rationale for the reissued HIA does include the more appropriate focus on post-mitigation scenarios,

Comment	Commenter	Response
based on the results of potential impacts of pre-mitigation scenarios of the Project. .. This revised draft of the RIA ... assesses the Project on the basis of post-mitigation scenarios." However, the original draft HIA stated that it considered these mitigation scenarios in its analysis. In fact, the original draft RIA concluded, "[m]itigation measures proposed in the EIR slightly decrease the ranking for odor, soil deposition, and traffic injury, but otherwise did not change the relative importance of the potential health impacts." I am concerned about the questionable manner in which this reissued draft came to be. Shortly after the original draft was released to the public, E&B sent a demand letter to the City through its attorneys, demanding that the City "retract and disavow" the draft. A copy of the letter is attached as Exhibit B. E&B demanded that the original draft "be immediately withdrawn by the City, with an acknowledgment by the City that it lacks scientific integrity and that it needs to be substantially revised to reflect compliance with recognized laws and scientific standards." E&B concluded with "the City must immediately retract the RIA and acknowledge that it has not been prepared in compliance with applicable laws and regulations." E&B forced the City to retract and disavow the original draft, forced the City to say that the original draft lacked scientific integrity, and forced the City to say that the original draft was not prepared in compliance with applicable laws and regulations, all under a thinly veiled threat of litigation.		the changes between the initial and reissued draft were also the product of the reevaluation of the HIA by additional scientists on the HIA project team with expertise in a number of the areas assessed taking into account the written and oral comments on the February draft HIA calling for extensive revisions, and the information in the Final EIR.
Both the original draft and the reissued draft acknowledge that there are no laws requiring the use of a health impact assessment, and there are no laws or globally accepted standards for health impact characterization in health impact assessment. So why did we need a reissued draft? The reissued draft admits it uses a "novel evaluation matrix." Why is that better than what was used in the original draft? If it is novel, doesn't that mean it has not been used before? Why should we trust this over the original? Strangely, the reissued draft was reformatted and rebranded to make it appear as if a different company prepared it. According to the McDaniel Lambert website, McDaniel Lambert joined Intrinsik on	J Hamill	While the rationale for the reissued HIA describes the need for the new report, including a more appropriate focus on post-mitigation scenarios, and the written and oral comments on the February draft HIA calling for extensive revisions. The word “novel” has been removed from the description of the evaluation matrix. While the project team who prepared the initial report also worked on the reissued report, the team also expanded, adding additional scientists to the HIA project team with expertise in a number of the areas assessed. The McDaniel Lambert integration into Intrinsik had occurred by the time of the re-issued draft and the company is now operating as Intrinsik, hence the update to the report format.

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August 16, 2013-- approximately six months before the issuance of the original draft. The same people who prepared the original draft prepared the reissued draft, but instead of calling themselves McDaniel Lambert, they called themselves Intrinsik. This was pointed out by Elizabeth Hodges Snyder on page 2 of her July 2, 2014 memorandum, but it appears her comment was ignored. Why should we believe that a new draft issued by the same people would have any more scientific integrity than the original? The nature of this project is unique in that that the citizens of Hermosa will vote on whether to lift ban on drilling. Accordingly, special attention should be paid to providing an unbiased and informative presentation of all potential health issues. Anything less is irresponsible. E&B has already seized on the whitewashed conclusions in the reissued draft HIA and uses them as propaganda to persuade voters that this project is completely safe. Attached as Exhibit C is a screenshot of the E&B website touting the reissued draft conclusion that "we do not believe that the Project will have a substantial effect on community health in Hermosa Beach." That statement ignores every adverse health effect described by the same people in the original draft HIA, and every vulnerable population mentioned in the reissued draft HIA. It is irresponsible, misleading and dangerous.		
1. Noise and Light: An increase in unwanted light emissions emanating from the 87 foot drilling rig is identified as having the potential to interfere with typical sleep cycles in nearby, line of site residences (page 103). Please explain how this does not have the potential to cause negative adverse health effects in these individuals.	S Hebl	The HIA does conclude a potential negative health effect for in those individuals with a line of site to the drill rig. Table 5-26 states "Although the magnitude [of the health effect] is 'low' for the majority of residents, it could be higher for those individuals with a bedroom window in the direct line-of-sight of the exposed side of the electric drill rig that will be lit at night. It is recommended that these individuals be provided with blackout blinds or curtains to eliminate any potential impact to typical sleep patterns."
2. Likewise, the notion of distributing "black-out shades" to nearby residents affected by the unwanted light emissions is discussed. While this mitigation, if acceptable to the residents, may help with light emissions, it is likely to cause increased levels of stress, frustration, and a perception of loss of control over the home environment that would have negative health effects.	S Hebl	The recommendation that blackout blinds or curtains be provided is provided as an option to those who may desire it (so they don't have to pay for them themselves). We recognize that residents may prefer to maximize air flow at night and therefore chose not to request blackout blinds or curtains. The text in the HIA is revised to clarify that the blackout curtains or shades are optional. It is acknowledged

Comment	Commenter	Response
The feelings of loss of control are likely to be particularly pronounced given the high property values in the area and the undesirable idea that the city is required to distribute black out shades to residents of $1,000,000+ homes in order to shield them from negative health effects from a public nuisance (i.e unwanted night time light pollution). This is likely to elicit increased stress and frustration from the loss of control over the home environment as well as the fear of decreased property values due to the intrusive nature of the proposed mitigation. Please update table 5-26 to take into account the practicality & limited effectiveness of the proposed mitigation (installation of black out shades in affected residences). Considering the impractical nature of this mitigation & the intrusion into the home environment, the adaptability and likelihood are misstated in the table. A conservative review would not use the black-out mitigation measure to reduce the likelihood or increase the adaptability, as the feasibility of this mitigation is unknown (i.e acceptance by nearby residents). Likewise the increased stress and frustration due to the loss of control of the home environment and perception of impaired home values is completely missed and has the potential for negative health impacts. Please update the summary on page 105 and page ix to properly account for the potential adverse health effects due the interruption of sleep patterns and the adverse health effects due to increased stress and frustration resulting from the loss of control over the home environment due to the need to install black out shades in residences.		that the opinion of the commenter is that the blackout shades have limited practicality and effectiveness. Please see Section 5.7.1 Property Values for a detailed discussion regarding negative health impacts including stress from fear of decreased property values.
3. The Upset Conditions summary (Blue Box page viii, page 78) should include the already documented (page 78) potential negative, moderate impact to health caused by elevated levels of distress over the possibility that a blowout could occur. When a post-mitigation, potential negative effect on health is identified it should be referred to in the summary.	S Hebl	The text in the blue box summary has been revised to include stress due to fear of a potential blowout.

Comment	Commenter	Response
4. Upset Scenarios: Table 8-1 (pg 157) The potential health outcomes due to Well blowout effects should be separated into two categories: a.) Injuries and/or fatalities b.) psychological effects including stress. The framework attributes (magnitude, adaptability, and likelihood) are very different for these two health outcomes and thus it is not appropriate to group them together. The assessment currently uses the same likelihood rating for injuries due to a blowout and negative psychological effects includes stress due to concern over a blowout. Clearly the likelihood of these two events is not the same.	S Hebl	Section 5.4.2 addresses both injuries/fatalities and psychological effects as health outcomes due to a well blowout. It was the decision of the HIA authors to assess a well blowout scenario as a single health determinant. The commenter's views in opposition to this decision are acknowledged.
5. Community Resources: Access to Recreational Resources and Green Space: The Draft HIA does not account for the significant, unavoidable environmental impact that results from incompatible land use with existing adjacent land uses as certified in the FEIR. The FEIR states on ES-9, ES-10 "The drilling, construction, and potential future operations would be in close proximity to land uses zoned as open space (parks, baseball fields and the Greenbelt) and residential. Proposed Oil Project activities during all phases may generate significant noise, odor, and visual impacts that would be incompatible with these adjacent land uses." Table 5-32 in the draft HIA speculatively suggests that potential revenue from the project may be used to "improve or expand existing tideland recreational or green space conditions" however it does not consider the negative effect on the nearby parks and open spaces due to the nature of the incompatible land use. The certified FEIR states that certain activities that may occur during all phases of the project would be incompatible with the existing nearby parks, baseball fields & Greenbelt. This has the potential to reduce usage of the nearby parks & green space (greenbelt, Ardmore park, South Park, Bi-Centennial Park). Likewise, on page 129 it is stated "there were no vulnerable populations identified for access to recreational resources and green space", however the green belt is approximately 80 feet from the project site, and the nearest park (Ardmore park) is approximately 230 feet from the project site. Since local risks were identified due to residential dwellings being in close proximity to the project site (150' to the north, 180' to the east, 250' to the west) the same negative	S Hebl	The Final EIR (FEIR) found a significant and unavoidable impact because noise, odors, and visual impacts generated from the proposed Project are incompatible with adjacent land uses (Section 4.10.4.1 Land Use). The health impacts due to noise, odors, and visual impacts are addressed in the HIA. The FEIR evaluated recreational use separately from incompatibility with adjacent land uses. In Section 4.10.4.2 (Recreation), the FEIR reads: "The Proposed Project may create noise, odor, and visual impacts nuisances to recreational users, especially users of the Veterans Parkway Greenbelt as they pass by the Project Site. However, the impacts of passing by the Project Site while using the Greenbelt would be short term, temporary, and avoidable. Therefore, this impact would be considered less than significant (Class III)." The FEIR identified a potential significant impact on recreation in the case of an oil spill from the pipeline. Therefore, we believe that the findings in the HIA are consistent with the FEIR's findings that the proposed project would have a less than significant impact to recreational users. It is noted that the HIA does address the potential impacts to recreational users throughout the report (e.g., traffic section assessed the impact to the Greenbelt due to construction and truck traffic activities, surface water and oil spill sections assessed the impact to beach-swimmers). Additionally, text has been added to the Final HIA to acknowledge that there will be disturbance to recreation and green space nearby the Project Site due to construction activities. The Final HIA still concludes an overall

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health impacts affect the parks and green space that are located 80' and 230' from the project site. Given that vulnerable populations frequently visit these locations (e.g children), the risks (real or perceived) from the project site will likely reduce access to nearby parks and green space. Additionally as stated elsewhere in the document the fear of fugitive emissions (particularly contaminated lead soil during drilling & clean-up operations) and odor will likely reduce the perception of the available parks & green space in these locations. This is the very reason that the FEIR finds the proposed project to cause significant unavoidable impacts to the surrounding environment due to the nature of the incompatible land use. It is a significant oversight to not assess the effect of the incompatible land use on the surrounding parks & green space in close proximity to the proposed site. Please update this section and include this analysis in table 5-32. The significant noise, odor, and visual impacts that may be generated during all phases of the project are likely to reduce the usage of parks & green space in the surrounding area due to a perceived reduction in quality of the nearby parks & green spaces. Likewise please remove the statement in the first paragraph on page 129 "Since there will be no impact to existing green space in Hermosa Beach". The FEIR states exactly the opposite by certifying that there is a significant and unavoidable impact to the parks and green spaces in close proximity to the proposed site due to the incompatible nature of land use. In summary, there will be a negative impact on access to green space due to the close proximity of parks to the project site and the incompatible land use.		positive impact to recreational areas and green space due to the increased revenue coming into the City, particularly with regards to the Tidelands Fund, available to improve beach and coastal areas used for community recreation. The cited text (page 129 of Draft HIA) has been revised to state "Since there will be no impact to the amount of existing green space in Hermosa Beach". This statement reflects the fact that the proposed Project would be constructed on an existing previously developed light industrial site and no additional land (i.e. no additional green space) would be acquired for the proposed Project.
6. Community Resources: Aesthetics and Visual Resources The analysis on page 136 of the health effects due to the unavoidable significant environmental impact to visual aesthetics does not follow the decision making framework on page 18, and no substantive explanation is provided to justify this deviation. Based on the health determinant framework on page 18, there is a Post-Mitigation Health Effect category specifically named "No Substantial Effect", which is defined as "there is no substantial effect expected following	S Hebl	The text "…however, this is not anticipated to have a substantial effect on health" was removed from the HIA (page 148 of the Draft HIA).

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implementation of the EIR mitigation measures". However, the assessment table 5-33 (page 139) determines that the post mitigation health effect due to the degradation of the visual environment is Negative, which is defined as "the effect is expected to negatively influence health following implementation of EIR measures". The summary statement in the first paragraph on page 148 states "This has the potential to influence levels of annoyance and stress; however; this is not anticipated to have a substantial effect on health." If the health effect due to the degradation of the visual environment is not expected to have a substantial effect on health, than it should be classified in this manner using the health determinant framework. There is a specific category for this finding which is titled "No Substantial Effect (Neutral)". However the finding in table 5-33, as a direct result of using the health determinant framework, is that the degradation of the visual environment WILL have a Negative health effect. Please remove the unsupported commentary that states "this is not anticipated to have a substantial effect on health" on page 148.		
7. Air Quality Summary (Page vi): The summary in the blue shaded block does not agree with the detailed discussion on the impacts of odor exposure on page vii and pages 63-64. Paragraph three on page vii states "According to the WHO, odor annoyance can also affect overall quality of life" yet the summary in the blue shaded block characterizes the health consequences due to odor exposure as "periodic discomfort and annoyance near the Project site". The summary should be strengthened to state "Odor can have various health consequences, and could result in periodic discomfort and annoyance near the Project site including a reduction in quality of life for sensitive recipients." Likewise, Table PS-2 classifies the Potential Health Outcome of Odor Emissions as "Acute health symptoms". However in the comments cell on the same row and on page 64 it is stated "Periodic discomfort & annoyance from odor releases is likely". Likely exposure to a noxious odor suggests more than an acute health risk and on the contrary suggests a longer term chronic health impact since the	S Hebl	The blue shaded blocks summarize the detail provided in the text. The various health consequences referred to in the statement "odor can have various health consequences" include headaches, nasal congestion, eye, nose, and throat irritation, hoarseness, sore throat, cough, chest tightness, shortness of breath, and overall quality of life. These health consequences are written out just below the shaded block in the Project Summary (and also in the odor section of the text). The HIA addresses the potential for increased stress due to the proposed Project throughout the HIA report.

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individual's quality of life is hampered. Exposure to odor releases from the project should be more clearly stated as having a potential negative affect on human health for individuals near the project site with the potential to negatively affect their quality of life. Additionally increased stress and reduction in quality of life is likely to be experienced by nearby residents of the project due to loss of control over their home environment. Many Hermosa Beach residents do not have air conditioning installed in their homes and make extensive use of window ventilation during the day and night. Due to the real or perceived risk of impacted air quality, odor emissions, and fugitive contaminated soil or airborne particles, these residents may feel stress over either leaving the windows open or stress over not being able to open the windows without concern for their health.		
8. Upset Conditions (Page viii, page72-75): Please explain why an oil spill scenario resulting in leakage to the ocean is the only spill scenario used to calculate the likelihood of such an event. The analysis should focus on the likelihood of all oil spills, including pipeline & truck spills and not be constrained to spills that only result in leakage to the ocean. Leakage to the ocean is not required to cause adverse health effects. This may not change the likelihood estimate; however it is technically more appropriate.	S Hebl	The Upset Conditions analysis was based on identification of the incidents that could present the highest risk to the public in conjunction with the greatest stakeholder concerns which were identified during the scoping meeting and subsequent communications.
9. Housing Prices: The HIA proposes that E&B consider conducting a property value analysis then continues on to state (page 123) "This would help to ensure that any observed fluctuations on property values remain within expected levels and consistent with other similar communities". A survey can in no way ensure that property values remain within any stated level. The survey can only document a pricing fluctuation but obviously it cannot ensure that property values remain within expected levels. Please modify this statement.	S Hebl	The sentence referred to by the commenter has been corrected to state "This would help document any observed fluctuations in property values and show whether they remain within expected levels consistent with other similar communities".
The Draft HIA identifies five potential negative health effects to people in close proximity to the oil & gas drilling site. However this important finding is not referenced in the executive summary or overall conclusion. The HIA should be health protective and inform the voting public of all possible post-mitigation health impacts due to	S Hebl	The HIA authors acknowledge the commenter's views regarding the content of the current summary, and an Executive Summary has been added to the report.

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the project in a straightforward and visible manner. Please modify the conclusion statement/summary to reflect the identified health impacts as follows: Based on the proposed mitigation measures in the EIR and additional recommendations provided by the HIA, on balance we do not believe that the Project will have a substantial effect on community-wide health in Hermosa Beach. However five negative possible health effects were identified for local residents in close proximity to the project site.		
I find inconsistencies with the rationale for the overall summary conclusion in the reissued Draft HIA which states in part "… on balance we do not believe that the project will have a substantial effect on community health in Hermosa Beach." At the public study session on July 22nd, Intrinsik personnel stated that the "no substantial effect" summary was supported by the rationale that the 5 negative health impacts were localized impacts and/or low probability and that the 3 positive health impacts were community wide. It was reasoned that the community wide effect of the 3 positive health impacts offset the localized nature of the 5 negative impacts.	S Hebl	The HIA authors did not intend to imply that positive health impacts will offset the negative impacts. It was consideration of all outcomes, negative, no substantial effect, and positive that let to this conclusion.
However upon deeper analysis, there are no positive impacts identified that have a direct impact on human health. The three positive impacts identified in the report are: Recreation & Green Space, Political Involvement, and Education Funding. The proposed project would not produce positive health effects due to Recreation & Green Space. The final EIR concludes the opposite and in fact that there is a significant, unavoidable environmental impact to adjacent land uses from the proposed project activities. The FEIR specifically includes "parks, baseball fields, and the greenbelt" in the description of adjacent land. The project impacts that are identified in the HIA and referred to as "nuisance related" degrade the quality of the surrounding parks & green space and impair these resources. It is also logical to reason that given fears of other more serious risks (fugitive lead particles during site preparation and/or clean-up, fear of a blow-out, or other accidents) that the perception of	S Hebl	The commenter's views that there are no positive health impacts resulting from the Project are acknowledged. The following statement has been removed from the HIA: "Since there are thousands of operating and proposed oil and gas wells in the state of California, particularly along the coast, it is reasonable to assume that the existence of oil project has not negatively impacted physical activity levels in other communities". Additionally, text has been added to the Final HIA to acknowledge that there will be disturbance to recreation and green space nearby the Project Site due to construction activities. The Final HIA still concludes an overall positive impact to recreational areas and green space due to the increased revenue coming into the City, particularly with regards to the Tidelands Fund, available to improve beach and coastal areas used for community recreation.

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these adjacent land uses is impacted which makes these locations less desirable. The city of Hermosa Beach has twenty four parks & green spaces and of these, six are located within 600 feet of the proposed site. Thus 25% of the city's parks & green spaces (Ardmore Park, Bi-Centennial Park, South Park, Clark Stadium, Greenbelt, 8th street & Valley) would be degraded, per the significant unavoidable environmental impact certified in the FEIR, by the proposed project. The statement on page 128 of the Reissued Draft HIA, which states that since the coastline of California has one of the lowest rates of physical inactivity and that "thousands of operating and proposed oil and gas wells exist" in these regions that it is reasonable to assume that the existence of oil projects has not negatively impacted physical activity does not adequately support the assumption that impairment of 25% of the city's park & green space will not negatively impact physical activity in Hermosa Beach. The comparison to physical activity levels along the coast of California in the presence of "thousands of oil wells" is seriously flawed and does not take into account the size of municipalities, location of the oil wells in relation to parks & green space, or a number of other important factors. Please remove this supposition from the report. Please update this analysis in the final report, and identify Green Space and Recreation as a negative health impact, not a positive health impact resulting from the project.		As described in response to S Hebl comment 5 above, the FEIR found that the overall impact to recreation would be less than significant. The FEIR identified a potential significant impact on recreation in the case of an oil spill from the pipeline. The findings in the HIA are consistent with the FEIR's findings that the proposed project would have a less than significant impact to recreational users.
The proposed project would not produce positive health effects due to Political involvement. The decision to proceed or not proceed with the project does not fully lie in the hands of each individual resident. As such, the health benefits due to self-efficacy do not exist at the individual level. It is widely apparent that the project is highly controversial and both the opponents and proponents are impassioned. Given that individuals have such strong feelings, but no direct, total control over the outcome, there is no increased benefit due to self-efficacy. On the contrary, many residents feel threatened by the project due to the potential for negative health effects, and thus experience high amounts of stress and anxiety over the political involvement. Refer to the Health Impact Assessment Community Survey conducted by McDaniel Lambert, Inc (page 9 of Original draft HIA) which concludes that 93% of residents polled are concerned	S Hebl	The HIA authors acknowledge the commenter's opposition to the conclusion regarding political involvement and have considered that individuals do lack complete control over the outcome of the project. The stresses involved and the potential negative health effects have also been addressed in the social cohesion section. However, the HIA authors wish to point out that unlike the vast majority of projects of this nature, it is the community that gets to decide through their vote whether the Project moves forward or not.

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about the potential health impacts resulting from the project. In addition, countless individuals dedicate significant amounts of their personal & leisure time to contribute to the voting debate (due to the public nature of the vote) and this impacts the health of these individuals. The lack of full control over the outcome and the stress and anxiety by those residents who feel threatened by the project have not been taken into account in your analysis. Please include this analysis in the report. These factors neutralize any potential positive benefits due to political involvement and cause this determinant to be Neutral. Please update this analysis in the final report.		
The Reissued Draft HIA suggests there would be a positive health benefit due to increased education funding resulting from the project, however no basis is provided to justify how the miniscule increase in funding will have a causal positive effect on human health. The Hermosa Beach City School District budget for fiscal year 2014-2015 is $10,186,219.00 (per the 14/15 budget approved by the School Board at the June 11, 2014 Board of Education Meeting – Appendix B). Thus the forecasted project contribution of $52,000.00 per year amounts to a 0.5% increase in educational funding. In order to support the assertion that a 0.5% increase in educational funding would have a community wide positive effect on human health, details need to be provided to describe how this small increase in funding would increase the state of education to a level substantially higher than is currently present. Any increase in educational funding is beneficial, however the question is does the amount of the increase provide such a benefit to the school district that it causes a change in the quality of education provided, and therefore a benefit to human health. In a school district where the quality of education provided is already extraordinarily high, a significant increase in revenue would be required to change the quality of education such that there is a measurable impact on human health. A 0.5% increase in funding is not significant enough to change the state of education provided by HBCSD and thus have an effect on human health. In the same manner that a 0.5% decrease in annual funding would not have a community wide negative impact on human health. Clearly the extent of the health impact (magnitude) due to a 0.5% increase in annual educational funding is LOW.	S Hebl	The HIA authors acknowledge the commenter's opposition to the conclusion regarding education funding and encourage the commenter to reach their own conclusion by applying a low magnitude to the HIA decision making framework. The statement "The average annual contribution to Hermosa Beach City School District would increase funding between 4% (based on CBA expected) and 9% (based on Applicant estimates)" has been corrected to state ""The average annual contribution to Hermosa Beach City School District would increase **private** funding 4% (based on **average** CBA expected) or 9% (based on **average** Applicant estimates) during peak production years."

Comment	Commenter	Response
Also please correct the statement on page 141 that incorrectly states "The average annual contribution to Hermosa Beach City School District would increase funding between 4% (based on CBA expected) and 9% (based on Applicant estimates). " These percentages were incorrectly calculated based off of the contribution from the Hermosa Beach Education Foundation, and instead should be calculated based off of the annual school district budget. Also, the same section refers to two potential figures for educational funding from the project – CBA expected and Applicant estimates. This is a biased approach since in addition to the CBA expected estimate, the highest estimate is also presented without presenting the lowest estimate (CBA low). Please remove this bias by either removing the Applicant estimate or also present the CBA low estimate. Also please review the entire report for other instances of similar bias which are present. Finally, it should be noted that the value of the annual educational funding will erode significantly over the life of the project since the $0.20 per barrel education tax is fixed and does not adjust for inflation. In summary, the magnitude of the educational funding provided by the project is LOW since based on the CBA expected estimates it would account for a 0.5% increase in annual funding, which would not increase the already high quality of education provided by HBCSD in a manner that would have an effect on human health. The result is that the educational funding provided by the project would have No Substantial Effect on human health.		
In conclusion, the three positive health impacts that have been identified in the Reissued Draft HIA are misclassified. The proposed project's effects on Recreation and Green space would have a negative health impact, the miniscule increase in Educational Funding would have No Substantial Effect on human health, and the lack of full control and associated stress and anxiety would cause the effects of Political Involvement to be Neutral. Thus, there are no community wide positive impacts on human health that would offset the already identified localized negative health impacts. And in fact as my previous letter describes the number of negative health impacts is actually eight (Odor Emissions, Well Blowout – physical harm, Well	S Hebl	The HIA authors acknowledge the commenter's views that there are no positive health impacts resulting from the Project, specifically the effects on recreation and green space, education funding, and political involvement. An Executive Summary has been added to the report to provide a summary of both positive and negative impacts as determined in the assessment sections of the report.

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Blowout – psychological effects including stress, Noise Emissions, Access to Recreation & Green Space, Light Emissions, Property Values, Aesthetic and Visual Resources) It may still be accurate that residents who do not reside in close proximity to the oil and gas drilling project would not experience any health effects related to the project. However, the fact that residents in close proximity may experience negative health impacts should be clearly mentioned in the final report summary. May I suggest the following wording which is transparent, unbiased, and accurately reflects the findings in the report: "Based on the proposed mitigation measures in the EIR and additional recommendations provided in the HIA, we do not believe that the Project will have a substantial health effect on most residents in Hermosa Beach, however residents in close proximity to the Project could experience negative health effects."		
As a final point, please modify the overall summary conclusion provided in the report so that it is transparent and unbiased. Some residents may read only the summary statement of the report and thus extra care should be exercised to ensure that the summary statement transparently reflects the findings in the report. To this effect, please include the total number of potential negative and positive health impacts in the overall summary statement. This will make the findings of the report easily accessible to all readers and also less prone to misinterpretation. The current summary provided in the reissued Draft HIA is overly prone to misinterpretation, is not transparent, and disregards the finding that there is the potential for localized negative health impacts by not providing this information in the summary statement.	S Hebl	The HIA authors acknowledge the commenter's views regarding the content of the overall summary conclusion statement, and an Executive Summary has been added to the report.
I have lived in Hermosa Beach at the above address since 1979 (35 years). I hope the Hermosa Beach Council does not allow the decibel level of the "Keep Hermosa Hermosa" movement to be decisive in their ultimate decision. I know the former Hermosa Beach as much many, if not most, of them, and can remember when I could still buy kitchen hardware on Hermosa Avenue. The new Hermosa has chi-chi boutiques and semi-affluent suburbanites hoping to increase their unearned riches by selling each other over-priced real estate. Not much of the "old" Hermosa is left. And if a majority really wants to be free of sordid businesses such as slant drilling, that means they want	B Hood	The voters will make the final decision on whether or not the proposed Project is approved.

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other localities to soil themselves with commerce so that we can continue to bum oil in the motor vehicles that still pack our roads. Being "environmentally aware" is the orthodoxy of today, but it is often based on a superficial desire to spout whatever is considered trendy. I urge the city council to base its decision on deeper issues, such as the prosperity and future wellbeing of all citizens.		
As I understand it, existing levels of PM2.5 already exceed WHO levels. In table 5.7 on page 51 Intrinsik lays out their estimates of existing PM2.5 levels and the impact of the project. On each line of the table there is a significant % increase in the post project PM2.5 levels. However, because Hermosa is already over the healthy threshold they magically conclude that further increases over that healthy threshold will have no substantial effect on our health. This makes no sense at all. More of a bad thing (PM2.5), which is ALREADY at too high a level, must surely have an adverse effect on our health. Their conclusion needs to change.	I Lee-Leviten	WHO recommends an annual concentration of 10 $\mu g/m^3$ as the annual air guideline for PM2.5 and the California and US standard is 12 $\mu g/m^3$. Assuming the background annual air concentration in Hermosa is similar to South Coastal Los Angeles County levels; the predicted $PM_{2.5}$ averaged across the community (baseline + project) results in concentrations of 10.46 to 10.66 $\mu g/m^3$, and is within the California/US standard. As described in the HIA, in the study that the WHO guidelines were based on, there is statistical uncertainty in the $PM_{2.5}$ risk estimate below approximately 13 ug/m^3. Therefore, the HIA authors believe that the California/US standard provides a more appropriate health-based benchmark. Commenter's opposition to the conclusion in the assessment of particulate matter is noted.
The HIA concludes that there is a positive health effect from enhanced recreational opportunities and from political involvement. This is so ridiculous they should have been incredibly embarrassed to write this stuff. I believe most people in Hermosa beach would feel that the recreational opportunities are already more than adequate. The idea that we need the oil royalties to enhance the recreational opportunities is just incorrect. As to the health benefits of political involvement, the people from Intrinsik obviously have not been awake during the council meetings that I've seen them at. The stress levels from this project are through the roof for many people especially for some of the "vulnerable populations" who live near the project. The ability to vote isn't reducing anybody's stress. Intrinsik needs to watch the videos of the July council meetings. The HIA cover page mentions Science, Integrity and Knowledge. These items seem to be missing from their analysis of Community Livability. They seem to be applying neither science nor common sense. I don't believe that for anyone living in Hermosa	I Lee-Leviten	Comment in opposition to conclusions regarding political involvement, recreational opportunities, and community livability is acknowledged.

Comment	Commenter	Response
Beach that the stress from thinking about the risk of a blowout, the noise, the light pollution, the smell, the health risks (despite what Intrinsik tells us) and all the other disadvantages of this project can in any way be reduced or offset because residents can vote. Personally, I wonder why they felt the need to go to such absurd lengths to create so-called benefits. Odd isn't it? This section needs to be much revised or eliminated from the final draft.		
Hermosa Beach does not need the toxic liability caused from drilling for oil. The proposed 30 wells would waste 30 million gallons of precious water. The toxic chemicals and sand belching back up to be trucked away would inundate the traffic on Valley. Overflow would increase the traffic on Ardmore and our friendly neighbors where the traffic of toxins would try to run through their city might sue to stop the danger. If an accident were to occur the oil company and Hermosa Beach would be sued. That is not a good possibility. The healthy green belt right in front of the digging noise, water and air pollution site will do little to encourage the exercising walkers and runners. The fresh air and the quiet atmosphere will be destroyed. Next door the Clark Building used for quiet community meetings will lose its atmosphere. The outdoor lawn bowling, tennis courts, Little League field and the existence of the Farmer's Market all in danger of noise and toxic air pollution and traffic. The drilling will harm our old underground waste and water pipes and demolish our streets with cracking and breaking, and create instability of building structures. The occasional tar on our beaches now will increase to ruin our beautiful beach community. Our views will be diminished. Our water and air compromised. Our property values will be hit hard and our neighborhoods ruined. Our community since my presence here in 1962 has been gaining in building a better community, nicer housing, nicer attractive beaches.	M May	The commenter's views in opposition to an oil extraction project are acknowledged.

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Let's keep it that way. We are not a dirty oil town. Go elsewhere.		
How can the City accept a report performed by company other than the one originally contracted with, and reported to be oil friendly, and whose pier review was conducted by a University who accepted $15m from Conoco. This report should be thrown out period!	T Northup	The consultants working on the HIA have remained the same throughout the project (McDaniel Lambert was acquired by Intrinsik). The commenter's views in opposition to consultant and peer reviewer are acknowledged.
Health Impact Assessment is a waste of public funds. One does not need HIA to affirm that the drilling site construction is located in the heart of the small city tightly surrounded by quiet neighborhood with narrow streets .. delivering necessary equipment and materials to build the site and transporting out oil during the site operation will create massive traffic of heavy tracks on residential streets of a small quiet city, destroying quality of life and wiping out property values .. .. And what is the necessity of such sacrifice?!? .. (the city was operated just fine for over 100 years without a problem) .. it is to line up coffers of public unions and city management for more wasteful spending Support of the project by Police and other union is a betrayal of city residents they are supposed to serve. Majority of people who are supporting this atrocity are not even residents of the city or property owners .. and should not be participating in this decision making, due to the conflict of interests .. they have everything to gain and nothing to loose .. The DRILLING must be stopped at ANY PRICE.	L Orlov	Please note that public funds were not used to produce the HIA. The City of Hermosa Beach required E&B to pay them for the HIA. The City chose McDaniel Lambert to provide the HIA. The commenter's views in opposition to an oil extraction project are acknowledged.
I am very concerned by the complete reversal of the health impact findings in the second version of the HIA. Since McDaniel Lambert was purchased by Intrinsik, a company which acknowledges that it does a great deal of work for the petroleum industry, I can only come to the conclusion that their reversal is due to the fact that they derive income from that industry and don't wish to bite the hand that feeds them. After attending the city council meeting in which their employees explained their "new" methodologies I completely lost faith in their document and believe it is highly subjective and caters to petroleum industry interests. I came to this conclusion not only because of their	C Prenter	The commenter's concerns regarding the findings of the reissued Draft HIA are acknowledged. As disclosed in their proposal for the project, McDaniel Lambert, prior to the purchase by Intrinsik, also had clients in the petroleum industry. Please refer to the Rationale for Reissued HIA, which is located in the beginning of the report before the Project Summary for more information regarding why the report was reissued and the Project Summary regarding the methodology of assessment and how conclusions were reached.

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complete reversal of findings, but also because of the way in which they allow for acceptable risks, as if there were a number of residents whose health could be affected and the project would still be acceptable. This is rubbish. Our current risk for health impacts due to oil drilling in this city is zero. That should be the baseline. Additionally, I reject how the HIA conflicts with the impacts stated in the EIR. There is no way putting up blackout curtains and smelling petroleum odors is acceptable for residents living near the proposed drill site — period. Stating that the project is beneficial to the community while hiding negative impacts deep within paragraphs of copy is disingenuous and misleading. And, there is no way that there is open space provided by this project, either. These findings are ridiculous. This oil drilling issue has been nothing but stress for many of us dealing with it for the past two years and I resent the way that Intrinsik has completely us sold out.		
This Health Impact Assessments report, just received by e-mail today, will be printed and read. However, my comments do not depend on any assessments. If you have seen "Years of Living Dangerously" (a 9 part Showtime documentary), you will understand my position regarding opposition to drilling oil in Hermosa Beach. This discussion about whether or not it can be done safely is irrelevant to our need to live sustainably without taking more fossil fuel from the earth anywhere....let alone, Hermosa Beach. We have alternatives to fossil fuel for our needs, and the pollution involved in the drilling was described in Marvin May's remarks. I take it further, because climate change is happening faster than anyone predicted. Money is not the key to our health and survival. Our city can live sustainably with better planning and the progress it has already made to make it a Green environment...eliminating smoking, styrofoam plastic, encouraging sustainable building, etc. We can do more to foster recycling grey water for our yards in this drought, not using our water for drilling for oil. Our Chamber of Commerce is not helping by making the Farmers Market Move to the Pier Plaza and including more commercial booths in the Fiesta del Artes. This seems to be in	J Pulcini	The commenter's opposition to an oil extraction project in Hermosa Beach is acknowledged.

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support of the oil drilling proposal and the commercial future of our city to depend on tourism, not our residents who sustain this community. We are the tax paying residents who live here, shop here, bank here, eat in our restaurants. More traffic is not welcome, especially the trucks we have seen doing assessments for oil drilling. That was a preview! We drive daily between 22nd St. and Ardmore and 5th Street. A healthy environment is a sustainable environment that would not be depending on oil revenues for our schools, city or beaches to be superior in every way....especially, healthy!!!		
I OPPOSE oil drilling here. The risk is too great. Please hear my voice as a 16 year resident of the beach communities. WE DON'T WANT IT.	C Reinagel	The opinion of the commenter in opposition to the Project is acknowledged.
Intrinsik's treatment of the Draft HIA appears to be an introduction of pro-industry bias to further its financial success as it "increases its presence in the United States" rather than an effort to address stakeholder comments and incorporate post-mitigation scenarios. The Final HIA should clearly communicate the health risks of this project to the residents of Hermosa Beach. It should include an effective Executive Summary that succinctly presents potential adverse and beneficial health effects. The Executive Summary should also clearly describe the current level of pollution in Hermosa Beach. Finally, its authors should release conflict of interest disclosure statements.	L Santora	The revised HIA was reviewed by an outside peer reviewer Dr. Elizabeth Hodges Snyder who stated that "Neutrality in tone and content is achieved." An Executive Summary has been added to the Final HIA. The HIA authors confirm that they had no conflict of interest in preparation of the HIA report. We note that our client in this endeavor was the City of Hermosa Beach and not the Applicant.
SUMMARY The Revised HIA appears to be a compromised version of the Draft HIA. The primary purpose of HIA is to inform decision making. It should ensure that the project is designed to maximize public health benefits and minimize negative health impacts. The Draft HIA for the E&B oil drilling and production project clearly concludes in its Executive Summary that "increases in nitrogen oxides and particulate matter in air can increase mortality rates, and respiratory and cardiovascular disease rates." In sharp contrast, the Revised HIA, which does not offer an effective Executive Summary, concludes "on balance we do not believe that the Project will have a substantial effect on community health in Hermosa Beach." Risks to public health from oil drilling and production are part of every stage of operation.	L Santora	The HIA authors agree that an HIA should clearly inform the public of the findings. An Executive Summary has been added to the Final HIA. The HIA authors confirm that they had no conflict of interest in preparation of the HIA report. We note that our client in this endeavor was the City of Hermosa Beach and not the Applicant.

Comment	Commenter	Response
The Final HIA should clearly inform the public of these risks. It should inform residents that some criteria air pollutants in Hermosa Beach already exceed established air quality standards (e.g., Particulate Matter [PM2.5]). Finally, Intrinsik and McDaniel Lambert should release conflict of interest disclosure statements to reassure the public that there are no real or perceived conflicts of interest (i.e., all known financial relationships with the oil industry; percentage of revenue generated from private vs. public contracts).		
PURPOSE OF HEALTH IMPACT ASSESSMENT (HIA) The U.S. Department of Health and Human Services (HHS) recommends HIA as a planning resource for implementing Healthy People 2020. Healthy People is a national initiative that provides science-based, 10-year national objectives for improving the health of all Americans. HIA supports two key directions of the Office of the Surgeon General's National Prevention Strategy: Building Healthy and Safe Community Environments and Empowering People to Make Healthy Choices . HIA can be a useful tool for identifying the impact of a new policy, program, or major project on community and individual health. The 2011 Centers for Disease Control and Prevention co-sponsored National Research Council report Imp roving Health in the United States: The Role of Health Impact Assessment found that the HIA holds promise for incorporating aspects of health into decision-making because of its • Applicability to a broad array of policies, programs, plans, and projects; • Consideration of adverse and beneficial health effects; • Ability to consider and incorporate various types of evidence; and, • Engagement of communities and stakeholders in a deliberative process.	L Santora	The acknowledgement that HIAs can be useful tools is appreciated. The cited National Research Council Report was one of several guidance documents relied on for the HIA report.
Controversy – Bias and Conflict of Interest The E&B oil drilling and production project is a contested decision proposal among polarized and disparate interests and stakeholders. It is paramount that the HIA "is conducted and the conclusions and	L Santora	Full disclosure of oil company experience was given to the City's selection panel at the time of McDaniel Lambert's initial interview. This disclosure was also given publically at two community meetings. Not only has McDaniel Lambert performed work for oil and gas

Comment	Commenter	Response
recommendations that are produced at the end of the process are impartial, credible, and scientifically valid." The National Research Council (US) Committee on Health Impact Assessment recommends that, "to the extent feasible, those who conduct the assessment should strive to avoid real and perceived conflicts of interests." There is growing unease that consultants who produce HIAs may have an inherent conflict of interest (e.g., industry contracts are their primary revenue source). Of concern, the preparer (Intrinsik) does not provide disclaimers for its financial relationships with the oil industry. The timeline of events surrounding the E&B HIA (i.e., acquisition of McDaniel Lambert by Intrinsik after selection of McDaniel Lambert by City of Hermosa Beach) and the Revised HIA's departure from the conclusions of the Draft HIA (e.g., Air Quality) raise concerns that the report's integrity may have been compromised. This is further supported by the "crisis communication"-style revisions to the report. While the findings presented in both reports are scientifically valid (the majority of which remained unchanged), negative language was removed, minimizing the adverse health impacts of this project. Moreover, groups have specifically requested that an Intrinsik expert be removed from a panel due to his industry- affiliations and the "reasonable apprehension of bias."		clients, but its two principals, Dr. Mary McDaniel and Dr. Charles Lambert were both employed by Unocal / Union Oil of California for 8 and 7 years respectively before forming their consulting firm in 1997. The commenter's statement that "groups have specifically requested that an Intrinsik expert be removed from a panel" may be referring to a letter posted online from the Alberta Energy Regulator which is the provincial agency that permits oil and gas facilities. The letter confirms Dr. Davies' (of Intrinsik but not associated with this HIA) appointment to an expert panel assembled to assess "Odours and Emissions form Heary Oil Operations in the Peace River Area. The full text of the letter from the Alberta Energy Regulator endorsing Dr. Davies appointment as an expert can be found online: http://www.aer.ca/documents/applications/hearings/1766924_AER_Letter_to_Registered_Parties.pdf That letter states: "Concerns were also raised about experts' industry affiliations. A general suggestion was made that the panel should exclude proposed experts with industry affiliations. Shell disclosed in its submission that both Dr. Zelt and RWDI have past and ongoing working relationships with industry; however no specific concerns were raised by any party in relation to these two proposed experts. Shell also noted it had worked with Intrinsik Inc., but not directly with Dr. Donald Davies, the panel's proposed expert. The issue of perceived neutrality is one that the panel had considered in establishing a list of proposed experts. However, the potential experts were selected based on requisite degree of expertise in the relevant field and on their availability. It was inevitable that some experts would have past affiliations with heavy oil operators. The concerns raised about neutrality of experts will be addressed in part by the fact that the panel will provide input into the issues and topics to be addressed in the expert reports, which will help to ensure that the reports are based on appropriate considerations. Further, all parties in the proceeding will be able to present questions to experts regarding the methods and findings in their reports."

Comment	Commenter	Response
		Intrinsik staff has and will continue to provide balanced, independent and scientifically valid assessments of the potential health impacts associated with all types of oil and gas activities. We again note that the client for this HIA was the City of Hermosa Beach, and not E&B.
COMPARISON: DRAFT VS. REVISED HIA Of utmost concern, the conclusions of the Draft HIA are markedly changed in the Revised HIA. For example, the health impact of changes in air quality is changed from significant to "no substantial effect." In public health, it is accepted to describe the significance of an exposure to a health hazard to describe risk (e.g., epidemiological studies show a significant correlation between exposure to air pollution and the frequency of respiratory symptoms -- ranging from cough symptoms to hospital admission.")	L Santora	The method for calculating risk due to changes in air quality in the initial Draft HIA was overly conservative and not useful for the decision makers. In the revised draft the estimated volume of emissions was compared to health standards set by the South Coast Air Quality Management District (SCAQMD) and the World Health Organization (WHO).
Presentation and Framework The Revised HIA is more visually appealing than the original. Overall, it improves upon the organizational structure of the Draft HIA. The Revised HIA uses a similar HIA Evaluation Framework with the following additions: EIR Mitigation, Adaptability, and Post-Mitigation Health Effect. It removes the ranking system presented in the original. Notably, unlike the Draft HIA, the Revised HIA does not provide an Executive Summary that succinctly outlines the potential health impacts of the proposed Project. This is concerning because the primary purpose of the HIA is to help stakeholder incorporate health into decision-making. Most residents will not read the entire HIA; therefore, it is imperative to provide an effective executive summary that analyzes and summarizes the most important points of the HIA.	L Santora	The HIA contains a "Report Summary" rather than an "Executive Summary". However, to address the concern that the summary is too long, an Executive Summary of the findings in the HIA has also been prepared.
Tone The tone of the Revised HIA could be perceived as "industry-friendly". In the Revised HIA, the significance of health impacts are obscured by many conditional statements (e.g., "could potentially impact health if they are released in sufficient quantities"). The report uses nuanced language, which minimizes the impact of the project on health (e.g., "have the potential," "can release," "in some circumstances.") For example, "Construction equipment and the vehicles that transport equipment can release fine particulate and	L Santora	The HIA authors believe that we achieved neutrality of tone. This was independently acknowledged by the peer reviewer her comments found in Appendix C. In the quoted text quoted "can" has been deleted.

Comment	Commenter	Response
diesel particulate matter into ambient air." The scientifically accurate and direct statement would be "construction equipment and the vehicles that transport equipment release fine particulate and diesel particulate matter into ambient air."		
EIR Mitigation The Revised HIA asserts the impact of the proposed mitigation measures presented in the EIR. However, it assumes the acceptability, feasibility, adoption and effectiveness of each proposed measure. There is no certainty that proposed mitigation measures will achieve the estimated reductions in pollutants.	L Santora	The Applicant has indicated that they will comply with the mitigation measures, made part of the development agreement, and therefore the HIA has made that assumption in its analysis. Please refer to Section 8 of the EIR which states: "As the Lead Agency under the California Environmental Quality Act (CEQA), the City of Hermosa Beach (City) is required to adopt a program for reporting or monitoring regarding the implementation of mitigation measures for this Project, if it is approved, to ensure that the adopted mitigation measures are implemented as defined in this Environmental Impact Report (EIR)." The commenter's views in opposition of this assumption are acknowledged.
Adaptability The addition of the Adaptability category is of significant concern in that it does not accurately categorize risk. It evaluates the question "How resilient is the community to this type of change; are they able to adapt?" For some measures it is subjective. For example, in the event of an oil spill, "will people be able to adapt to the change with some difficulty and maintain pre-project level of health with some support?" For others it is not applicable. For example, the measurement of adaptability as it relates to air quality understates the health impact of pollutant exposure. Below are two examples of the impact of relatively small exposures to pollutants on adverse health outcomes. Current research demonstrates a significant relationship between particulate matter and cardiovascular Disease. Cardiovascular disease is the leading cause of premature death in Los Angeles County. A 14-day lagged cumulative moving average of 10 microg/m3 PM (2.5) was associated with a 13.1% increase in Heart Failure admissions (Pope, 2008). PM (2.5) elevated by 10 microg/m3 was associated with increased risk of acute ischemic coronary events	L Santora	Adaptability is often used in HIAs as a measure of community resilience. The commenter points out that for some measures the adaptability category is subjective. By its nature, there are parts of HIA that are subjective. The adaptability to air pollutants was ranked as "high" because the pollutants (baseline plus project) did not exceed health-based thresholds. Therefore, community members will be able to maintain pre-project level of health. The commenter correctly describes the cardiovascular effects of particulate matter. If the concentrations of particulate matter generated by the proposed Project were high enough to result in an increase in cardiovascular disease, then adaptability would be categorized as "low" (people will not be able to adapt or maintain pre-project level of health). The Buffalo study summarized in these comments was a cross sectional study that looked at childhood asthma incidence in the west part of Buffalo that is downwind from the Peace Bridge which is a massive roadway connecting the US and Canada. Not surprisingly, an increase of childhood asthma was noted in this area of the city. The

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(unstable angina and myocardial infarction) equal to 4.5% (Pope, 2006). Childhood exposure to indoor air pollution, much of which penetrated readily from outdoor sources, may contribute to the development of wheeze symptoms among children ages 5 to 7 years. Positive associations between Asthma Control Questionnaire (ACQ) scores and respirable particulate matter (PM), coarse particulate matter (PM10), fine particulate matter (PM2.5), nitrogen dioxide (NO2), and ozone (O3). In multivariate regression analysis of risk factors, residence in the west Buffalo neighborhood was an independent risk factor for asthma diagnosis (Lwebuga - Mukasa et al. 2004). Furthermore, this area was shown to be downwind of putative sources of traffic- related pollution emanating from truck traffic (Lwebuga-Mukasa et al. 2005). Notably, the current levels of PM2.5 in these vulnerable Buffalo neighborhoods are significantly lower than those currently reported by SCAQMD for the Hermosa Beach zip code (www.airnow.gov). Therefore, it is inaccurate to categorize adaptability as 'high' in reference to air pollutants, in that it wrongly asserts that people are expected to be able to easily adapt to the change in pollutant levels (i.e., people will be able to maintain their pre-project level of health). This categorization significantly minimizes the risk of pollutant exposure, which is concerning in a community that exceeds air quality guidelines.		design of the study made it difficult to tease out which of the several exhaust related air pollutants may have been responsible for the increase in childhood asthma.
Post-Mitigation Health Effect This new variable is also concerning in that it depends on major assumptions: 1. The estimated levels of pollutants are accurate (see below); 2. The significance thresholds are accurate (see below); 3. The mitigation proposed achieves expected reduction in pollutant levels; and, 4. Actual post-mitigation pollutant exposures do not have an impact on individual health.	L Santora	The Applicant has indicated that they will comply with the mitigation measures, made part of the development agreement, and therefore the HIA has made that assumption in its analysis. This is detailed on page 13 where "This is because once the EIR is certified the mitigation measures must be adhered to." Estimated post-mitigation levels of air pollutants are compared to health protective levels used by the SCAQMD and WHO to estimate potential health impacts. While objective data are used whenever possible, there is a large part of the HIA that is subjective.

Comment	Commenter	Response
Notably, the third party reviewer states "What needs to be clarified, though, is how the various aspects of the metric are weighted and totaled (or otherwise utilized) to come to a post-mitigation health effect determination." This remains unclear in the published document. While Figure 2-3 was added, there are no clear, objective, evidence-based guidelines for categorizing magnitude, adaptability, and likelihood across all measures.		The HIA authors believe that it is very clear in the reissued Draft HIA how the aspects of the evaluation metric are weighted to come to the post-mitigation health effect determination (see Figure 2-3). It was the intention that the HIA be transparent about how the different categories were determined so that the reader could see how the decision was made whether or not he/she agreed with it.
Hermosa Beach is an urban setting with high exposures to ambient air pollution – from stationary and mobile sources. There are established putative exposures to industrial pollutants (AES, Chevron, LAX; major traffic corridors). Baseline air quality measurements in EIR are from SCAQMD, monitoring station – LAX Hastings (6.8 miles to the north of the Project Site). This is the oldest active air quality monitoring station. SCAQMD reports need for replacement of instrumentation and sub-systems. Additionally, the system does not support continuous monitoring of PM10/2.5. Furthermore, monitoring station location in reference to Project Site may underestimate current local pollutant levels in Hermosa Beach (e.g., location in reference to putative sources). Finally, the EIR assumes that the SCAQMD Air Quality Significance Thresholds accurately estimate health impacts. SCAQMD daily threshold (pounds per day) for particulate matter (PM) 10 and 2.5 are 150 and 55 pounds per day. Notably, in 2010, BAAQMD proposed daily thresholds of PM 10 and 2.5 at 82 and 54 pounds per day, respectively. Threshold models are now being reevaluated because (1) a theoretical assumption of wide- ranging human sensitivity, and (2) inability to detect thresholds in epidemiologic models. Furthermore, threshold models do not consider vulnerable populations. Despite the lowest levels of economic hardship in Los Angeles County(1 out of 201), the life expectancy in Hermosa Beach falls in the 3rd quartile (61 out of 101) [80.4 years vs. 80.3 years, LAC]. Notably, there is strong evidence of the association between reductions in fine particulate air pollution and improvement in life expectancy. This is significant since the Construction Phase of		The HIA authors do not agree that the air monitoring station at LAX could underestimate pollutant levels in Hermosa Beach as air in Hermosa Beach and other coastal communities is generally acknowledged to be of higher quality than inland. The commenter is referred to the FEIR regarding the points about the EIR Air Quality Significance Thresholds as the HIA did not apply the same significance thresholds.

Comment	Commenter	Response
Proposed Project is estimated at 5-years. Traffic from construction and operations are marginal when compared to total mobile source emissions in Hermosa Beach. But, increases in pollutant levels could have a significant local impact.		
Community Livability Factors It appears that adjustments in the "Community Livability" section were intended to frame the proposed project in a positive light (e.g., educational funding and community resources). For example, the magnitude of educational funding was changed from low in the Draft HIA to medium. This appears to overestimate the impact of a new revenue stream (e.g., % of HBCSD total revenue). Also, ranking the adaptability as high is an unjustified assumption of the health impact of an additional revenue stream. Finally, it doesn't consider the number children/families affected by new revenue as percentage of total population. Also, in the original scoping greenhouse gases were considered because "Hermosa has a goal of being carbon neutral. This health determinant is important to residents." Rather than exclude it, it may have been more appropriately considered in the Community Livability section. For example, what would be the health effect of an approved project that is inconsistent with the City's adopted goals (e.g., political involvement; social cohesion)? The ballot outcome would be determined by the percentage of registered voters who actually vote on the ballot measure and their casted vote (which is also not addressed in the Community Livability section). Voter turnout and its influence on the outcome could either negatively or positively affect social cohesion and political activity measures. Also, the Revised HIA changes classification of Community Resources – Recreational Resources and Green Space from negative health impact to positive health impact. The Revised HIA minimizes the impact of construction (duration and location) on typical use of the Valley Drive Corridor (e.g., relocation of City Yard; reduced access to Greenbelt during construction). Active transportation is key component of Livability; the project would affect the utilization of this corridor for non-motorized local and thru-traffic). Also, the	L Santora	The commenter's disagreement with the selected magnitude and adaptability categorizations for education funding is acknowledged. The HIA authors encourage readers to reach their own conclusions about the magnitude, etc. Regarding greenhouse gases, the reissued Draft HIA states that the issue requires a broader assessment to be addressed adequately, not that the issue of greenhouse gasses is unimportant. The commenter's point about how the goal of being carbon neutral as a city may be woven into the social fabric of the community is acknowledged. The commenter opposes the findings in the Recreational Resources and Green Spaces. Text has been added to the Final HIA to acknowledge that there will be disturbance to recreation and green space nearby the Project Site due to construction activities. The Final HIA still concludes an overall positive impact to recreational areas and green space due to the increased revenue coming into the City, particularly with regards to the Tidelands Fund, available to improve beach and coastal areas used for community recreation.

Comment	Commenter	Response
report asserts the favorability of the project of Green Space in terms of use of Tideland funds, which is unknown at time (i.e., it is unknown whether revenue from this fund would increase recreational resources available to residents).		
CONCLUSION The Revised HIA understates the adverse health impacts of the proposed project. Short-term and long-term exposure to particulate air pollution are established environmental risk factors for cardiovascular and pulmonary morbidity and mortality. The Final HIA should clearly communicate these risks to residents to support informed decision making.	L Santora	The HIA authors agree that exposure to particulate air pollution can pose a health risk, including increased risk for cardiovascular and pulmonary morbidity and mortality. However, the assessment concluded that any exceedances of the WHO air quality guidelines are based on existing background levels in the area and the Project is not expected to have a material impact on existing $PM_{2.5}$ related health risks.
On page 26 of the revised HIA report it states the following: "In the first Draft of the HIA the potential health outcomes of greenhouse gas generation from the Project were briefly evaluated. However, the authors of the reissued draft HIA Report do not believe that localized or community health effects related to potential greenhouse gas emissions can be adequately evaluated in a project-level HIA. Rather, the global issue of greenhouse gas generation requires a much broader assessment of state and national sources and policies to adequately evaluate cumulative impacts of the energy sector." The authors of the reissued draft HIA Report are incorrect in their "belief" that localized or community health effects related to greenhouse gas emissions cannot be adequately evaluated in a project-level HIA. Facts exist that make "beliefs" unnecessary and these facts should be part of the Final Health Assessment. Since oil drilling is currently banned, the crude oil that E&B proposes to recovered is presently safely sequestered and poses no greenhouse gas or health risks to our South Bay citizens. The carbon and CO2 produced by burning this now sequestered oil must be added to now existing estimates of greenhouse gas emissions. Based on the Environmental Protection Agency's calculation*, each barrel of crude oil generates 0.43 metric tons of CO2. This project estimates 17.1 million barrels of oil to be recovered. Using the EPA	South Bay 350	The HIA authors agree that climate change is associated with a number of adverse health outcomes. As such, global greenhouse gas levels do affect community health on a local scale (through the mechanisms described by the commenter including flooding and extreme heat, etc). However, it is not possible to predict the community health changes resulting from the proposed Project, which will result in a very small proportion of the cumulative CO2 released into the atmosphere world-wide.

Comment	Commenter	Response
standard calculation the 17,100,000 barrels of oil will produce 7,353,000 metric tons of CO_2. http://www.epa.gov/cleanenergy/energy-resources/refs.html Current CO_2 levels are 400ppm. Climate scientists report that to maintain a civilization on par with the one we have developed to date, CO_2 levels should be at 350ppm. Adding the 7,353,000 metric tons of CO_2 from the oil to be recovered will accelerate the rise of CO_2 levels in our atmosphere. http://350.org/about/science/ At the 2007 UN IPCC meeting in Copenhagen the only agreed upon climate goal for all participating countries was to limit global warming to 2C degrees. http://www.rollingstone.com/politics/ news/global-warmingsterrifying-new-math-20120719 Current carbon budget estimates indicate that approximately 500 gigatons of carbon can be burned before the 2C degree global warming danger zone is reached. At current burn and emission rates, we will exhaust our carbon budget at some point from 2028 to 2040. Therefore adding an additional 7,353,000 metric tons of CO_2 from the currently sequestered oil in question will accelerate global temperature increases, push us to 2C degrees of global warming sooner than if that oil were not burned. Likewise it will increase the CO_2 levels which are already at record levels for human history. Locally, global temperature rise is impacting Hermosa Beach through rising sea levels which threaten infrastructure and the local services. Rising sea levels cause storm surges and related flooding to increase and reach further inland from the coastline. Related local health impacts from flooding include reduced availability of fresh food and water; interruption of communication, utility, and health care services; contributions to carbon monoxide poisoning from portable electric generators used during and after flooding impacts; increased stomach and intestinal illness among evacuees; and contributions to mental health impacts such as depression and post-traumatic stress disorder (PTSD). These impacts will worsen with the additional		

Comment	Commenter	Response
7,353,000 metric tons of CO2 emitted from the E&B oil recovery project and these impacts cannot be mitigated. United States Environmental Protection Agency "Climate Impacts on Human Health" http://www.epa.gov/climatechange/impacts-adaptation/health.html Locally, global temperature rise is impacting Hermosa Beach and South Bay residents by making our ocean more acidic and negatively impacting marine life. Fish and their food supplies are diminishing as a result, impacting the seafood supply and its related health benefits. These impacts will worsen with the additional 7,353,000 metric tons of CO2 emitted from the E&B oil recovery project and these impacts cannot be mitigated. Locally, global temperature rise is responsible for increased drought which reduces our local water supply and puts public health at risk due to compromised quantity and quality of drinking water; increased recreational risks; effects on air quality; diminished living conditions related to energy, air quality, and sanitation and hygiene; compromised food and nutrition; and increased incidence of illness and disease. Centers for Disease Control "Drought and Health" http://www.cdc.gov/nceh/drought/ Locally, global temperature rise and its associated and proven increased fire risk impacts Hermosa Beach and the entire South Bay. Local health impacts include injury and death caused by fire as well as air quality health risks from smoke and toxic material emissions. These impacts will worsen with the additional 7,353,000 metric tons of CO2 emitted from the E&B oil recovery project and these impacts cannot be mitigated. Locally, global temperature rise and related change in climate is impacting Hermosa Beach by diminishing the ability of local and state farmers to grow the food crops we rely on based on the reduced water supplies and the climate change that has altered growing conditions. These impacts will worsen with the additional 7,353,000 metric tons of CO2 emitted from the E&B oil recovery project and		

Comment	Commenter	Response
these impacts cannot be mitigated. Locally, global temperature rise is causing extreme weather conditions that cannot be mitigated and which will impact the health, welfare and quality of life of Hermosa Beach citizens. Specifically the EPA reports that these impacts can reduce the availability of fresh food and water; interrupt communication, utility, and health care services; contribute to carbon monoxide poisoning from portable electric generators used during and after storms; Increase stomach and intestinal illness among evacuees; and contribute to mental health impacts such as depression and post-traumatic stress disorder (PTSD). These health impacts will worsen with the additional 7,353,000 metric tons of CO2 emitted from the E&B oil recovery project and these impacts cannot be mitigated. United States Environmental Protection Agency "Climate Impacts on Human Health" http://www.epa.gov/climatechange/impacts-adaptation/health.html The impacts of future heat waves can be especially severe. For example, in Los Angeles, annual heat-related deaths are projected to increase two- to seven-fold by the end of the 21st century, depending on the future growth of greenhouse gas emissions. Heat waves are also often accompanied by periods of stagnant air, leading to increases in air pollution and the associated health effects. These health impacts will worsen with the additional 7,353,000 metric tons of CO2 emitted from the E&B oil recovery project and these impacts cannot be mitigated. United States Environmental Protection Agency "Climate Impacts on Human Health" http://www.epa.gov/climatechange/impacts-adaptation/health.html Locally, global temperature rise will impact the health of Hermosa Beach and South Bay citizens with negative impacts from reduced air quality including increases in ozone, changes in allergens and changes in fine particulate matter. Additional health impacts will come from from climate-sensitive diseases including foodborne diseases, water-borne diseases and animal-borne diseases Health impacts from heat waves include heat stroke and dehydration which		

Comment	Commenter	Response
are the most common cause of weather-related deaths. In addition to the above proven negative local impacts caused by the greenhouse gas emissions from burning the 17.1 million barrels of oil projected to be recovered, the E&B project must also add the greenhouse gas emissions that will be added to our carbon budget from the building and operation of the oil recovery project itself. Every fossil fuel-burning transportation truck, every fossil fuel-powered piece of construction equipment, every fossil fuel-powered piece of oil recovery equipment used by the E&B project throughout the life of the project must all be counted as additional CO2 and greenhouse gas emissions that would not otherwise have been emitted without overturning the current ban on oil drilling in Hermosa Beach. These additional emissions must be added to the 7,353,000 metric tons of CO2 the recovered oil will produce. These additional greenhouse gas emissions will further accelerate global temperature rise and accelerate and increase each of the negative health impacts in all the categories cited above. * EPA calculations of CO2 emissions per barrel of oil burned: http://www.epa.gov/cleanenergy/energyresources/refs.html Barrels of oil consumed - Carbon dioxide emissions per barrel of crude oil are determined by multiplying heat content times the carbon coefficient times the fraction oxidized times the ratio of the molecular weight of carbon dioxide to that of carbon (44/12). The average heat content of crude oil is 5.80 mmbtu per barrel (EPA 2013). The average carbon coefficient of crude oil is 20.31 kg carbon per mmbtu (EPA 2013). The fraction oxidized is 100 percent (IPCC 2006). Calculation: 5.80 mmbtu/barrel × 20.31 kg C/mmbtu × 44 kg CO2/12 kg C × 1 metric ton/1,000 kg = 0.43 metric tons CO2/barrel		

Appendix C-2

Peer Reviewer Comments and Response to Peer Reviewer Comments

Memo

To: Intrinsik Inc.

From: Elizabeth Hodges Snyder

Date: July 2, 2014

Re: External peer review of the June 26, 2014 Draft Health Impact Assessment, E&B Oil Drilling and Production Project

Background

In mid-June 2014, Intrinsik Inc. contracted with me to conduct an external peer review of the June 26, 2014 Draft Health Impact Assessment, E&B Oil Drilling and Production Project. The peer review was requested at two levels: initial "high level comments" by July 3, 2014 and "detailed comments" by July 9, 2014. Review is to focus on the process, methodology, scope, thoroughness, and neutrality of the Draft HIA for the proposed E&B Oil Drilling and Production Project. The initial review (i.e., the focus of this memo) is meant to serve as a preliminary evaluation of draft completeness and acceptability prior to client submission. Detailed comments will follow in a second memo, which will provide a more thorough treatment of areas that would require modification prior to my recommended acceptance of the document, as well as any minor issues that could be optionally addressed to strengthen the assessment report.

Peer Review

There is a host of national and international resources to inform and guide peer review of a completed HIA, many of which are cited in the Draft HIA itself (e.g., Fredsgaard et al., 2009; Bhatia et al., 2010; Hebert et al., 2012; and Ross et al., 2014). An additional resource particularly appropriate for initial "high level comments", and that was developed with reference to the aforementioned sources, is a rubric created by the 2012-2013 HIA Living Library Sub-Committee within the Society of Practitioners of Health Impact Assessment (SOPHIA) (http://hiasociety.org/?page_id=57). The relatively simple rubric outlines a brief methodology for selecting examples of high-quality HIAs, and identifies keys elements of HIA practice and report quality. This tool was utilized in the preliminary evaluation of the Draft HIA for the proposed E&B Oil Drilling and Production Project.

The following peer review discussion identifies the list of criteria by which the Draft HIA was preliminarily evaluated, and provides select brief comments (which will be addressed in greater detail, and added to, in the second level of review). I use the word "recommended" several times, but anticipate some currently cited recommendations will be identified as "requirements for acceptance" following the second level of review.

Identifies the sponsor of the HIA, the team conducting the HIA, and all other participants in the HIA and their roles

The sponsor of the HIA and the team conducting the HIA are well identified, but additional details on other participants (e.g., specific decision-makers, specific stakeholder groups) and their roles are recommended.

Worth noting, too, is some slightly incorrect wording under the "Prepared by" heading on the second page of the document. It states "Intrinsik Inc. (formerly McDaniel Lambert, Inc.)". While the intent is to highlight the fact that initial HIA work was conducted by McDaniel Lambert, Inc., which is now a part of Intrinsik Inc., the current verbiage suggests that McDaniel Lambert, Inc. was renamed Intrinsik Inc.

Describes some level of stakeholder input

Yes, stakeholder input was collected and the input collection process is briefly described, but additional detail is recommended in order to better assess the thoroughness of the engagement efforts, and identify any subgroups that may have been left out. For example, relevant details might include the time of day during which meetings were scheduled, how the meetings were advertised, how many were in attendance, how vulnerable subpopulations were included, and how the meetings were facilitated. I do recognize, however, that the sizes of the vulnerable subgroups are relatively small.

Appendix C appears to be missing.

Clearly describes the methods of the HIA

Yes, in terms of the components, steps, and the general metric for evaluating impacts. What needs to be clarified, though, is how the various aspects of the metric are weighted and totaled (or otherwise utilized) to come to a post-mitigation health effect determination. There are several guidance documents available that provide methods that can support more consistent, replicable determinations. For example, a reader, without additional clarification, might rightfully find it perplexing that the "Odor Emissions" and "Surface Water" health determinants both have assigned "EIR Mitigation Measures", and also have the exact same identified "Potential Health Outcomes", "Geographic Extent", "Magnitude", "Adaptability", and "Likelihood" designations, but receive different "Post-Mitigation Health Effect" designations (i.e., "negative" and "no substantial effect", respectively).

Includes logic model, or other articulation, linking proposal to health determinants and health outcomes

Yes. The pre-mitigation models primarily illustrate potential adverse health impacts (or, if the impacts could go in either direction, the negative direction may be more obvious to the reader), and might be improved following a fresh look at them with potential benefits also in mind (which are indeed addressed in the text).

Throughout the HIA, describes the evidence sources used

Yes, though some in-text citations appear to be incomplete.

Profiles existing conditions (can be a separate baseline section or integrated with assessment)

Yes.

Assessment includes discussion of both health determinants and health outcomes

Yes. As is common in health discussions, however, distinctions between “health outcome”, “health impact”, and “determinant of health” sometimes get loose and imprecise.

Assessment: For each specific health issue analyzed, details the analytic results

Yes, but this is where I anticipate the greatest amount of additional feedback in the second level of review. The different categories of analyses and discussion will benefit from an additional round of editing for consistency in values reporting and the provision of additional details pertaining to the success of the proposed mitigation measures in other similar development projects. For example, in Sections 5.3.2.2 and 5.3.2.3 (Soils), lead is discussed. In the latter section, a soil lead concentration of 9500 mg kg^{-1} is mentioned as a threshold, which is actually very close to the maximum concentration detected (9680 mg kg^{-1}) and significantly above the reported commercial scenario screening level of 320 mg kg^{-1} (not to mention that the implications of the measurement depth of 15 feet are not addressed).

Further, it is difficult to judge the appropriateness of the “unlikely” designation for inhalation or ingestion. The “unlikely” designation is given based upon the expected mitigation measures, but no background information pertaining to the historical success of such mitigation measures in similar scenarios is provided or referred to. Thus, it follows that the classification of “no substantial effect” could be called into question, particularly when the mitigation measure calls for potential soil removal (which could be problematic if the contamination is several feet deep) well after soil disturbance can be expected (i.e., Phase 3).

The critiques like the ones just presented do not necessarily mean that the conclusions are inaccurate, but that more information/discussion is needed.

Includes recommendations clearly connected to analysis and proposal/decision / Recommendations are prominently written

Yes, though brief and relatively few in addition to the mitigation measures recommended in the EIR.

Report includes an executive summary or something like it

Yes. An important inconsistency to note, however, is the reference to the Draft HIA as being, or not being, a “stand alone document”. For example, on pages iv and 1, it is referred to as “stand alone”, but on page 17 it is explicitly stated that it is **not** “stand alone”. This is an important distinction in purpose that will affect the type of appropriate content and structure of the document.

Also, the determinants of health table seems to get cut off in printing, which may be problematic for some members of the public.

Report is written well -- uses good grammar, spelling, punctuation, etc.

Yes, only minor, occasional grammar oversights and apparently erroneously accepted autocorrect wording. Additionally, the report explicitly states in multiple instances that the overarching purpose is to characterize both potential positive and negative health impacts, and not to take a position regarding development approval. Neutrality is achieved in the attempt to fairly identify both positive and negative potential impacts.

Report is organized or written in a way that makes it easy to understand the story

Yes.

Some discussion of possible evaluation and/or monitoring taking place in the future is mentioned

Yes, though brief.

Recommendation

It is my opinion that the Draft HIA contains the necessary components and is in adequate form to share with the client, providing that the issues identified above are acknowledged and that the client is aware of the forthcoming second level of peer review. I anticipate providing subsequent detailed comments addressing both recommended and required (for my own acceptance of the HIA) clarifications and modifications, but none that necessarily preclude submitting the Draft HIA to the client for feedback.

A Review of the 6.26.14 Draft Health Impact Assessment, E&B Oil Drilling and Production Project

A peer-review prepared in July 2014 by:

Elizabeth Hodges Snyder, MPH, PhD
Assistant Professor of Public Health
Soil Scientist
University of Alaska Anchorage

Introduction and Aim of Review

In mid-June 2014, Intrinsik Inc. contracted with the author to conduct an external peer review of the June 26, 2014 Draft Health Impact Assessment, E&B Oil Drilling and Production Project. The peer review was requested at two levels: initial "high level comments" by July 3, 2014 and "detailed comments" by July 9, 2014. Review was to focus on the process, methodology, scope, thoroughness, and neutrality of the Draft HIA for the proposed E&B Oil Drilling and Production Project.

The initial review (i.e., the focus of the July 2, 2014 memo to Intrinsik, Inc.) was meant to serve as a preliminary evaluation of draft completeness and acceptability prior to client submission, and utilized an HIA evaluation rubric developed by the 2012-2013 HIA Living Library Sub-Committee within the Society of Practitioners of Health Impact Assessment (SOPHIA) (http://hiasociety.org/?page_id=57). The relatively simple rubric outlines a brief methodology for selecting examples of high-quality HIAs, and identifies keys elements of HIA practice and report quality. With this rubric, I concluded that the Draft HIA contained the necessary components and was in adequate form to share with the client, providing that the issues identified in the "high level comments" were acknowledged and that the client who contracted the HIA was aware of the forthcoming second level of peer review.

The "detailed comments" provided in the second review (i.e., the focus of this report) are meant to inform final preparations of the Draft HIA for public release (on July 14, 2014) and comment period (through August 14, 2014).

Approach to the Peer Review

There are no formal or mandated guidelines for HIA evaluation in the United States. However, there are several resources that can serve as useful tools in assessing HIA methodology, scope, and thoroughness, including those by Fredsgaard et al. (2009), Bhatia et al. (2010), Hebert et al. (2012), Rhodus et al. (2013), Ross et al. (2014), and the previously mentioned Society of Practitioners of Health Impact Assessment (SOPHIA, http://hiasociety.org/?page_id=57). For this review, the detailed rubric developed by Fredsgaard et al. (2009)

(https://www.scambs.gov.uk/sites/www.scambs.gov.uk/files/documents/HIA%20Review%20Package%20-%20Ben%20Cave%20Assoc.pdf) guided the development of the "detailed comments" in the following section.

Review Comments

Comments are provided using two approaches: 1) within Table 1, which is organized by review area and associated subcategories, and 2) as bullet points that do not otherwise fit within the existing Table 1 categories. In both approaches, recommendations are bolded and italicized. Those recommendations that this reviewer deems as critical for finalizing an HIA for public review are shaded blue.

Table 1. Detailed comments organized by review area and subcategories. Adapted from Fredsgaard et al. (2009).

<u>Context</u>	<u>Comments</u>	<u>Response</u>
Site description and policy framework		
The report should describe the physical characteristics of the project site and the surrounding area	***Additional information pertaining to the physical characteristics of the proposed project site is needed in a single section (e.g., Section 1.3)***. The reader is provided details (e.g., that the site overlays a landfill, surrounding buildings) in a piecemeal fashion as the report progresses, but it would be most useful to have the information in a single section early in the report. Otherwise, it is difficult for the reader to visualize the space or assess the types of activities that occur there.	***Section 1.3 now provides additional details pertaining to the proposed Project Site.***
The report should describe the way in which the project site and the surrounding area are currently used	***Additional information pertaining to the ways in which the proposed project site and surrounding areas are used is needed in a single section (e.g., Section 1.3).*** The reader is informed that the site is the City Maintenance Yard and eventually learns of some current activities onsite (e.g., the storage of fuel tanks) and off, but it would be most useful to have the information in a single section early in the report. ***Further, the map in Figure 1-1 is useful, but appears to be*** *missing a scale* ***and only identifies schools. Additional features would allow the reader to visualize and assess other potentially important subpopulations and factors (e.g., housing density, specific businesses, vulnerable populations).*** As currently presented, the map feels to this reader	***Section 1.3 now provides additional information on surrounding land use. Figure 1-1 was replaced with Site location map (with a scale) that is more appropriate for this Section.*** ***Although a map is not needed, vulnerable and sensitive subpopulations are now discussed in further detail in Section 2.4 and 5.1.5***

	incomplete and tokenistic.	
The report should describe the policy context and state whether the project accords with significant policies that protect and promote wellbeing and public health and reduce health inequalities	The report provides an appropriate context to the proposed project, community reactions, the upcoming vote, and relevant information contained in the EIR. ***A small point of clarification within Section 1.0: What is the relationship, if any, between Macpherson Oil Company and E&B?***	Macpherson Oil sold its interests to E&B at the time of the settlement agreement. Details now provided in Section 1.0
Description of project		
The aims and objectives of the project should be stated and the final operational characteristics of the project should be described	The aims, objectives, and characteristics are well described. However, ***the map in Figure 1-1 would be strengthened by the inclusion of the proposed pipeline in addition to the proposed project site.***	**Section 1.3.3 references where the reader can find a depiction of the proposed pipeline routes (Final EIR, Section 2, Figure 2.15). We note that the preferred route was not finalized at the time of certification of the EIR.**
The estimated duration of the construction phase, operational phase and, where appropriate, decommissioning phase should be given	Well described.	No response required.
The relationship of the project with other proposals should be stated	No other proposals are mentioned, but the EIR and Cost-Benefit Analysis are described in relationship to the HIA.	No response required.
Public health profile		
The public health profile should establish an information base from which requirements for health protection, health	No additional comment. Weaknesses and gaps are identified in Section 7.0.	No response required.

improvement and health services can be assessed		
The profile should identify vulnerable population groups. The profile should describe, where possible, inequalities in health between population groups and should include the wider determinants of health	***The report acknowledges the presence of vulnerable subgroups (i.e., those living in poverty, the young, and the elderly), but sections under 5.1 would be strengthened by additional discussion, and potential visual representation if possible, of where these vulnerable subgroups are located.*** Otherwise, it is difficult to assess whether they would be disproportionately impacted by the proposed project. ***If there are no other subgroups that can be mapped, mentioning this would be equally useful.***	**Clarification was added to Sections 2.4, 5.1.5 and the individual evaluation matrix tables in each assessment in Section 5.0. A column was also added to the summary table provided in the Project Summary and Conclusions (Section 8.0) that details each of the vulnerable populations considered.** **Schools were the only potential vulnerable subgroup that could be mapped and provided in Figure 5-8.**
The information in the profile should be specific about the timescale, the geographic location and the population group being described and links should be made with the proposed project	***Inclusion of the future profile of the population is recommended.***	Discussion has been added to Section 5.1.5 and describes that given the age demographic of Hermosa Beach that it is not anticipated that there will be a demographic shift over the life of the Project.
Management		
Identification and prediction of health impacts		
The report should describe the screening and scoping stages of the HIA and the	No additional comment.	No response required.

methods used in these stages		
A description of how the quantitative and qualitative evidence was gathered and analyzed (where appropriate) should be given and its relevance to the HIA justified	***Additional clarification is needed pertaining to how the various aspects of the metric are weighted and totaled (or otherwise utilized) to come to a post-mitigation health effect determination.***	**Additional clarification regarding the evaluation matrix, including details on how various elements are weighted and used to inform a Post-Mitigation Health Effect, has been provided in Section 2.4 (including the addition of Figure 2-3) of the reissued draft HIA.**
Governance		
The governance process for the HIA should be described	No additional comment.	No response required.
The terms of reference for the HIA should be available to the reader and the geographical, temporal and population scope of the HIA should be made explicit	No additional comment.	No response required.
Any constraints in preparing the HIA should be explained	No additional comment.	No response required.
Engagement		
The report should identify relevant stakeholder groups, including organizations responsible for protecting and	***Specific stakeholder groups should be identified, even if they were not engaged using individualized strategies and/or they did not participate*** (as noted for E&B representatives in Section 7.0).	***An expanded discussion on stakeholders and public engagement is provided in Section 4.1.***

promoting health and wellbeing that should be involved in the HIA		
The report should identify vulnerable population groups which should be involved in the HIA	***If specific vulnerable subpopulations were not involved in the HIA, it should be noted as a limitation in Section 7.0. If they were involved, it should be noted in the stakeholder engagement discussions.***	**Clarification was added to Sections 2.4, 5.1.5 and the individual evaluation matrix tables in each assessment in Section 5.0. A column was also added to the summary table provided in the Project Summary and Conclusions (Section 8.0) that details each of the vulnerable populations considered.** ***Details have also been added in Section 4.1 on stakeholder engagement.***
The report should describe the engagement strategy for the HIA	***Additional detail is recommended in order to better assess the thoroughness of the engagement efforts, and identify any subgroups that may have been left out.*** For example, relevant details might include the time of day during which meetings were scheduled, how the meetings were advertised, how many were in attendance, how vulnerable subpopulations were included, and how the meetings were facilitated. Also, there appears to be a discrepancy between the engagement activities listed in the fourth paragraph on page 18 and the third paragraph on page 17; ***clarification needed. Further, it is not clear what the "Community Dialogue process" is, in terms of how this fit into the overall engagement***	**Additional detail on stakeholder engagement activities, including meeting dates, times, locations, etc. is provided in Section 4.1. Also, clarification regarding 4.1 how the Community Dialogue process fit in to overall engagement is provided in Section 4.1.** **No vulnerable populations or interested stakeholders were left out based on the extensive consultation efforts undertaken**

	strategy, particularly at its first mention in the report; clarification needed.	**for the Project.**
<u>Assessment</u>		
Description of health effects		
The potential health effects of the project, both beneficial and adverse, should be identified and presented in a systematic way	Generally, this is accomplished. However, the timescales of short-term and long-term impacts are not provided.	An attempt was made to characterize whether potential health effects would be short-term or long-term in each of the assessment sections. For example the air quality section describes both short-term (acute) and potential long-term (chronic) effects.
The identification of potential health impacts should consider the wider determinants of health such as socioeconomic, physical, and mental health factors	No additional comment.	No response required.
The causal pathway leading to health effects should be outlined along with an explanation of the underpinning evidence	No additional comment.	No response required.
Risk Assessment		
The nature of the potential health effects should be detailed	No additional comment.	No response required.
The findings of the assessment should be accompanied by a statement of the level of	No additional comment.	No response required.

certainty or uncertainty attached to the predictions of health effects		
The report should identify and justify the use of any standards and thresholds used to assess the significance of health impacts	No additional comment.	No response required.
Analysis of distribution of effects		
The affected populations should be explicitly defined	No additional comment.	No response required.
Inequalities in the distribution of predicted health impacts should be investigated and the effects of these inequalities should be stated	***Vulnerable subpopulations are acknowledged throughout the HIA, but ultimately do not appear to be factored into the final assessment of post-mitigation impacts as there is no specific metric that facilitates this. If this is accurate, then this should be discussed as a limitation. If this is not accurate, additional clarification is needed.***	**Clarification was added to Sections 2.4, 5.1.5 and the individual evaluation matrix tables in each assessment in Section 5.0. A column was also added to the summary table provided in the Project Summary and Conclusions (Section 8.0) that details each of the vulnerable populations considered.** ***The following text was included in Section 2.4:*** ***"Vulnerable populations were also included as part of the assessment and the potential for disproportionate impacts on these individuals was***

		carefully considered in the classification of magnitude and adaptability. They were also taken into account when making additional recommendations.”
Effects on health should be examined based on the population profile	See immediately preceding comment.	See above response.
<u>Reporting</u>		
Discussion of Results		
The report should describe how the engagement undertaken has influenced the HIA, in terms of results, conclusions or approach taken	No additional comment.	No response required.
The report should state the effect on the health and wellbeing of the population of the option and any alternatives which have been considered	***The assessment would be strengthened by brief discussions of the “do nothing” option (i.e. a “no project” option) for each category of impact.***	***A brief discussion on the “No Project Alternative” is now provided in Section 4.2.***
The report should justify any conclusions reached, particularly where some evidence has been afforded greater weight than others	No additional comment.	No response required.
Recommendations		
There should be a list of recommendations to	No additional comment.	No response required.

facilitate the management of health effects and the enhancement of beneficial health effects		
The level of commitment of the project proponent to the recommendations and mitigation methods should be stated	***Addressing this is recommended. Perhaps even more important is the inclusion of (or reference to) examples where the recommended mitigations have been successfully applied under similar circumstances.*** This type of information would help the uninitiated reader determine whether the proposed mitigations are acceptable.	***Section 6.0 now provides further details on responsibility for implementing recommendations and additional details on monitoring.***
There should be a plan for monitoring future health effects by relevant indicators and a suggested process for evaluation	***A follow-up community health assessment is proposed, but additional details pertaining to potential timing, responsible parties, evaluation, and application of findings are needed.***	**Section 6.0 now provides further details on responsibility for implementing recommendations and additional details on monitoring.**
Communication and layout		
Information should be logically arranged in sections or chapter and the whereabouts of important data should be signaled in a table of contents or index	Well done. The recommendation feature boxes and bolded text in determination paragraphs are helpful to the reader.	No response required.
There should be a lay summary (executive summary) of the main findings and conclusions of the study. Technical terms, lists of data and	No additional comment.	No response required.

detailed explanations of scientific reasoning should be avoided in the summary		
All evidence and data sources should be clearly referenced	No additional comment.	No response required.

Additional bulleted comments:

Comments	**Response**
Neutrality in tone and content is achieved	No response required
Even in the updated July 3, 2014 draft, a discrepancy exists between the executive summary and later text with respect to the HIA being a "stand alone" document. ***It should be clarified which is correct.***	**The text has now been clarified that the HIA is a complementary document to the EIR and CBA and not a stand alone document.**
On pg. 49 re: health risks associated with PM: what is the incremental increase in risk with specific incremental increases in concentration? Incremental risk is addressed elsewhere, but not for PM.	The Project's potential contribution to local ambient concentrations of $PM_{2.5}$ was summarized in Table 5-7. On average, the Project is predicted to result in a 24-hour $PM_{2.5}$ concentration of 0.5 μg/m^3 and an annual $PM_{2.5}$ concentration of 0.09 μg/m^3 across the 1.5 x 1.5 mile air quality study area. As such, the Project itself will contribute a minor amount to the existing baseline concentrations of $PM_{2.5}$, suggesting that the incremental health risks are low.
There is a great deal of variability in the level of detail provided in the various "______ and Health" sections. Particularly striking is the limited depth of information for the two categories identified as of most concern to the community, i.e., oil spill and well blow out. ***It's recommended that additional detail be provided in these two sections.*** ***Further, some specific contaminant concentrations and associated health risks for Section 5.2.3.1 are also needed.***	**Additional information is provided in the following sections: 'oil spill and health' (Section 5.4.1.1) and 'well blowout out and health' (Section 5.4.2.1).** **The toxicity reference values for the individual TACs were provided in the EIR and the HARP model. Given that all of the hazard quotients and cancer risks were below their respective regulatory criteria additional details for individual chemicals were not provided in**

Similarly, specifics are needed for naphthalene and volatile organic compounds (VOCs) in Section 5.2.4.1 and 5.2.4.2 (or an explanation for their absence), otherwise the rationale for the emphasis on hydrogen sulfide (H_2S) is unclear.	**the HIA.** **Section 5.2.4.1 provides an overview as to why H_2S was considered the driving compound for odor issues. Naphthalene and VOC issues were captured in the TAC section for potential health effects.**
The assessment recommends that soil-related health impacts be reassessed after Phase I testing – but this recommendation seems to only apply to health impacts of particulates. ***It is recommended that runoff also be considered.***	**Section 5.3.2.3 in the soil assessment now notes that surface water controls and mitigation measures will prevent the runoff of soil particulates offsite.**
For each category of impact, it would be extremely helpful to the reader to have a map that identifies the predicted radius of impact – acknowledging that the various impacts may have different radii (e.g. radii for noise versus explosion). Currently, it is difficult to visualize the extent of impact from the proposed site.	**The EIR provides numerous maps for zone of influence of many of the determinants of health assessed. Therefore, in order to avoid duplication they were not provided in the HIA. Sections have been updated to identify which sections of the EIR provide pertinent figures.**
For each category of impact, it would be extremely helpful to the reader to have a map that identifies the predicted radius of impact – acknowledging that the various impacts may have different radii (e.g. radii for noise versus explosion). Currently, it is difficult to visualize the extent of impact from the proposed site.	See above response.
• ***In the definition of "PM" in the Glossary of Terms, the diameter should be changed from "ug" to "um".***	**Acknowledged, the definition has been updated in the Glossary.**

The assessment states that impacts to groundwater are not assessed because groundwater is not used for drinking, but other issues to consider include the connectivity of groundwater to other water resources, potential future uses of groundwater, and current uses of groundwater other than for drinking. Even if none of these issues apply to the location of the proposed project, ***acknowledging these potential concerns could be useful to the reader.***	**Protection of GW resource is addressed in the EIR and details have been added to Section 4.2.2. of the HIA.**
Where possible, it is recommended that justification be provided whenever environmental monitoring data are generalized beyond their original point of collection (e.g., air quality in Hermosa Beach assumed to be similar to that of Hawthorne; page 42).	**This was the only example of where environmental data outside of Hermosa Beach was used in the assessment. It was justified in the text as being the closest station.**
It seems odd that stress isn't listed as a post-mitigation health effect for upset/accident scenarios. Suggest revisiting.	Sections 5.4.1 and 5.4.2 now address stress as potential post-mitigation health effects.

Appendix C-3

Peer Reviewer Letter

Memorandum

To: Intrinsik Inc.

From: Elizabeth Hodges Snyder

Date: 9/3/2014

Re: Review of external peer-review comment response in the July 14, 2012 Draft Health Impact Assessment E&B Oil Drilling and Production Project

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This memo is to certify that I, Elizabeth Hodges Snyder, have reviewed the July 2014 responses of Intrinsik Inc. to my previously provided peer-review of the June 26, 20414 Draft Health Impact Assessment E&B Oil Drilling and Production Project. My concerns and comments have been adequately addressed.

Appendix C-4

Response to Public Comment on Initial Draft HIA

APPENDIX C-4: RESPONSE TO PUBLIC COMMENTS ON INITIAL DRAFT HIA

Comment	Commenter	Response
General Comments		
The initial draft of the HIA is very thorough and, in my opinion, not necessarily inaccurate. The problem I have with it is lack of proper context. I'm not sure how this can be addressed but feel it is extremely important that a context solution is found. What I'm referring to is the alarming nature of the document. For it to be thorough and accurate it seems difficult for it not to read this way. But if this firm was to complete the same evaluation of, say, an individual's commute from Hermosa to work in downtown Los Angeles, or even a walk to the grocery store, the report would undoubtedly give the same alarmist impression.	D. Inskeep	*The revised draft HIA provides a transparent means of assessing potential health impacts (positive and negative) that the Project may have on the community.*
Consistently present the mitigated project in all tables	MRS	*Tables and text in the revised draft HIA focus on the mitigated project as outlined in the final EIR. Pre-mitigation effects are discussed only briefly to provide context and highlight the effort that has already gone in to mitigating community impacts. Additional recommendations were made in the revised draft HIA if potential negative health effects still exist from the mitigated project.* *The revised draft HIA consistently references the mitigation number from the final EIR in each of the sections.*
Many of the impacts are associated with vehicle emissions, dust and noise. As a comparison, they should study the associated impacts of a large construction project. For instance, there is an apartment building located at 8th and Cypress. If that was razed and another building constructed, how would that impact residents in terms of truck traffic, noise and dust?	Council-member Petty	*The revised draft HIA focuses on potential health impacts of the proposed project. An assessment of health consequences of other decision-making processes and projects is beyond the scope of this draft HIA.* *The revised draft HIA acknowledges that many of the health determinants assessed (i.e. noise, light, traffic) are similar to those expected during construction activities which are a common occurrence in urban areas. Please see the respective assessments (Section 5.0) in the report for further details.*
Issue Area: Similarities and Differences to EIR		
The HIA states 'While CEQA legally requires health-based standards be address in the EIR, traditionally	Alston & Bird	*The text within the revised draft HIA has been updated to further expand on the rationale for conducting an HIA in addition to an EIR*

Comment	Commenter	Response
EIRs are not designed to comprehensively address health impacts, including social and economic determinants of health.' The HIA dismisses in its entirety all of the State standards for the protection of the environment and public health, and replaces it with an assessment based on a literature review from Google searches and informally published literature. Any HIA prepared by the City must comply with existing laws and regulations, as they are the governing and recognized standards for the environment and public health. Given that this HIA does not utilize these standards, it should be retracted, and its statements disavowed by the City.		*and provides discussion on the value of HIA as a complimentary process in Section 2.2. Additionally, peer-reviewed scientific literature and grey literature were the main sources of information for the revised draft HIA.* *The HIA expands on existing health considerations in the EIR. The rationale for the HIA lies in its unique approach to assessing a multitude of potential impacts (both positive and negative) to individual/community health. The HIA is intended to provide additional information, as well as relying on existing information provided in the EIR, to holistically evaluate health. Although the reports are complementary, in several instances the HIA provides further details on how specific aspects of the Project could positively or negatively affect the health of the community, and provides additional recommendations where necessary.*
In contrast to the HIA, the draft EIR does appear to utilize the applicable laws and regulations in its analysis of air quality, water resources, soils, noise, transportation and circulation.	Alston & Bird	*The revised draft HIA specifically notes when regulatory thresholds are considered in the analysis of air quality, water resources, soil, noise, and traffic. Please see the revised assessment (Section 5.0).*
To the extent that the HIA purports to address only topics that are not covered in the EIR, it should eliminate any discussion of air quality, water resources, soils, noise, vibration, lighting and traffic. These topics are addressed in the EIR pursuant to recognized laws and applicable standards, and should take precedence over guesswork and unscientific speculation.	Alston & Bird	*The HIA is meant to be a complementary document to the EIR and there are a number of sections that do indeed overlap. The revised draft HIA focuses on the post-mitigation Project scenarios and provides a transparent evaluation matrix to ascertain whether the potential health effects are positive, negative or neutral for the project.*
Directly address the differences with the EIR/CEQA approach in the Executive Summary and in the first few paragraphs of the introduction	MRS	*This was completed in the revised draft HIA.*
Issue Area: Summary Table		
The EIR concludes that all of the project's air quality impacts are less than significant, except for odors. (Draft EIR, pp. ES-20 -- ES-23.) The HIA's assessment of air quality, however, states, again, without any recognized scientific basis, that the magnitude of the health impact from Particulate Matter is "severe" and the likelihood of this health impact is "likely." (HIA,	Alston & Bird	*The revised draft HIA contains a new assessment framework and extensive revisions to the Air Quality session have been made.*

Comment	Commenter	Response
Table ES-1.) The health impact from Volatile Organic Compounds is also listed as "severe" with a likelihood of "possible." The table notes state that "severe" refers to health effects that are "chronic, irreversible or fatal." It is completely irresponsible for the City to suggest that the air quality impacts of the project could be "fatal" when that is simply not true as demonstrated by the analysis in the draft EIR which contradicts that statement.		
Revise the table, if used, to address the magnitude reduction with the use of the average.	MRS	*The air quality assessment section in the revised draft HIA has been extensively revised and reports that no substantial health effects are anticipated based on the mitigated project scenario.*
Summary table – can they share the inputs for each ranking and how they were derived? As an example, at the community presentation, one of the document authors presented a slide demonstrating how the ranking for traffic was derived. One of the elements was determined to NOT have an effect YET, it was ranked -1. Perhaps I misunderstood, but wanted this clarified.	Council-member Petty	*Section 2.4 of the revised draft HIA presents a new evaluation metric to characterize potential health impacts and the definitions of the inputs to that metric. In the "Project Impact" sub-section of each health determinant in Section 5, the revised draft HIA provides a detailed assessment of potential impacts and justification for each 'ranking' within the metric (i.e., geographic extent, magnitude, adaptability, and likelihood).*
Issue Area: Scope of HIA		
I do not see why GHG emissions are a health factor as indicated in the appendix – it appears they are deemed one as residents have deemed them one. But is there a real local health impact from GHG emissions?	J. Faulstich	*GHG emissions were removed from the assessment sections of the revised draft HIA report and a rationale for their exclusion is provided in Section 4.2.1 of the revised draft HIA.*
Was the survey a scientifically conducted study? If not, it should be completely removed from the HIA. I would like to know how and who they reached out to for this survey. Simply from looking at the reported geographical dispersion of the results, 68% of the candidates live west of xxx. Because the text is cut off, I do not know what that that line of demarcation is. In addition to that, they need to disclose their sampling methodology to prove that this is a cross section of the community, as opposed to (for instance), purely sampling the attendees of an oil related community meeting. Otherwise, their sample would be biased, and not representative of the community as a whole.	Council-member Petty	*In Section 4.1, the revised draft HIA clarifies that the survey was not a scientific study. The online survey was a convenient way to facilitate public input into the scoping process while minimizing time and expense associated with traditional survey techniques. However, we recognize that the informal online survey precluded the recruitment of a representative sample of the population. Because the survey was one method, among others, to gather input from the community and no scientific conclusions are made with the results, the fact that the respondents do not constitute a representative subsample of the population is not considered to be a significant limitation of the HIA.*

Comment	Commenter	Response
Issue Area: Air Quality		
I would recommend deleting the references to benzene studies done in China, Ecuador, and Croatia as they are flawed (as mentioned in the report) and oil fields operate under different conditions in other countries.	W. Barr	*The Air Quality section in the revised draft HIA has been extensively revised and references to the benzene cancer studies were removed from the revised draft HIA as they were no longer relevant.*
Likewise misleading is the paragraph citing WHO statistics on the deaths of 150,000 children due to climate change, while following up with the paragraph that it is difficult to predict the effect of climate change on local scales (pg 31-32). Particularly when a previous table says that the health impact from greenhouse gases is considered to be low (table ES-1).	W. Barr	*GHG emissions were removed from the assessment sections of the revised draft HIA report and a rationale for their exclusion is provided in Section 4.2.1 of the revised draft HIA.*
I think the HIA was weak or remiss in exploring and identifying or ruling out the risk of cancer clusters surrounding oil and gas production facilities.	H. Simon	*The Air Quality section in the revised draft HIA has been extensively revised. The results of the Toxic Air Contaminants (TAC) assessment indicated that there would be no unacceptable cancer risk from Project-emissions.*
Revise the report with the population weighted average across the City of Hermosa Beach (note: ONLY the population within the City of Hermosa Beach), but also somehow address that peak concentration associated with the mitigated project in the EIR. Revise the text to address the use of the weighted average throughout.	MRS	*The Air Quality assessment section in the revised draft HIA has been extensively revised and reports that no substantial health effects are anticipated based on the mitigated project scenario.*
Review the cancer classification for VOC of severe, as it only increases the burden by less than 0.01. Check text on this also. Note that much of the unmitigated project cancer risk comes from diesel particulate.	MRS	*The Air Quality assessment section in the revised draft HIA has been extensively revised and reports that no substantial health effects are anticipated based on the mitigated project scenario.*
With regards to the air quality analysis, it appears that they are not reviewing the impacts associated with the project. Rather, they are taking our existing conditions, layering in the potential incremental impacts, *then* providing an assessment of the risks associated with the resulting air quality. They should instead inform us of the impacts **purely** associated with the project and incorporate the probabilities of such potential impacts.	Council-member Petty	*The Air Quality assessment section in the revised draft HIA has been extensively revised and includes consideration of current air quality, the emissions from the Project alone and that of potential cumulative addition of the Project emissions onto the existing current conditions.*
Are the oil fields referenced similar projects in scope and technology?	Council-member Petty	*During the revisions to the draft HIA, the authors determined that the referenced benzene studies were not relevant to the assessment of TAC (toxic air contaminants) which included benzene among other*

Comment	Commenter	Response
		contaminants and were removed from the document.
Will the odors of this project be similar to hog farm odors? It would be useful to have a frame of reference.	Council-member Petty	*The revised draft HIA (Section 5.2.4) acknowledges that adverse health outcomes from odors, which are reported in the epidemiologic literature, are associated with facilities known for having higher and more continuous/frequent emissions of odorous compounds, such as pulp and paper-mills, confined animal feeding operations and solid waste landfills. The odor section has been significantly updated in the revised draft HIA.*
The HIA purports to use a "conservative" assessment by applying a City-wide exposure to PM10 and NO2 but such wild calculations would never be an accepted methodology, much less a conservative one, as it completely misrepresents the facts. No scientist would ever utilize the maximum concentration at stationary source and then apply that same concentration to every resident located within the City - proven and tested scientific models demonstrate that this scenario would never occur. The HIA then uses that baseless methodology to determine health impacts and mortality rates throughout the City. Based on a completely fictional City-wide exposure, the HIA concludes that N02 emissions will result in an estimated 6 additional cases of asthma incidence. (HIA, p. ii.) In truth, the N02 emissions are negligible. This same unscientific method of applying the pollution concentrations to all residents in Hermosa Beach was utilized for PM10, resulting in an ostensible mortality increase, which serves no purpose other than to cause confusion and fear.	Alston & Bird	*The Air Quality assessment section in the revised draft HIA has been extensively revised and reports that no substantial health effects are anticipated based on the mitigated project scenario.*
Another example, the HIA just assumes that H2S is "ten times higher" than the worst case used in the draft EIR (1,000 ppm v. 100 ppm) without any source or justification whatsoever. (HIA, p. 41.) In fact, the H2S is expected to be far less than 100 ppm - the draft EIR notes that sampling data for other wells in the Torrance Oil Field have H2S levels of 2.5 to 6 ppm. (Draft EIR, p. 4.8-60.) With 1,000 ppm exposure, death is likely (Draft	Alston & Bird	*The odor section has been significantly updated in the revised draft HIA.*

Comment	Commenter	Response
EIR, Table 4.8-6, p. 4.8-25), and the HIA's use of that number is intended to scare the reader and the resident into fearing so-called public health effects which simply do not exist. Furthermore, any H2S release of 6 ppm would be located at the source (in the pipe) and would immediately disperse, resulting in significantly lower concentrations before it even reached the walls of the drill site. The HIA's conclusion that the "Geographic Extent" of H2S is "Community-Wide" (HIA, Table ES-1) is not only wrong; it is highly inflammatory and unfairly prejudicial.		
Will there be signs put up prior to the election outlining the "Red Zone"? If not I suggest we do so everyone can get an idea the exact size of the "Red Zone".	J. Lange	*The Air Quality assessment section in the revised draft HIA has been extensively revised and reports that no substantial health effects are anticipated based on the mitigated project scenario.*
Increase in mortality rate – needs to be 0.0. I'm not sure how people could ethically vote on a project where there is even the slimmest percentage of possibility of people's health being affected.	S. McCall	*The Air Quality assessment section in the revised draft HIA has been extensively revised and reports that no substantial health effects are anticipated based on the mitigated project scenario.*
Issue Area: Pipeline Rupture/Well Blowout		
Could there not be more mitigations to further reduce the chance of a pipeline rupture resulting in oil loss to the ocean? Should double walled pipe should be required, maximum operating temperature and sulfur content of crude oil be specified (consistent with material of pipe including corrosion protection)? Perhaps ensure signage indicating the existence of the pipeline to reduce accidental puncture by construction equipment? Perhaps annual hydrotest requirement?	J. Faulstich	*This comment relates to engineering controls and mechanisms to mitigate the risk of a pipeline rupture which are outside the scope of a health impact assessment. Refer to the EIR Response To Comment for a response to these questions.*
I did not see an assessment or estimate of the injuries/fatalities which might occur during a worst case natural gas blowout event or sour gas loss of containment.	J. Faulstich	*Section 4.8 of the final EIR includes a risk analysis of the likelihood of an individual fatality or injury for each release scenario. Additionally, a separate section assessing potential health impacts of accidents or upset conditions has been provided in the revised draft HIA.*
Issue Area: Noise/Light		
It would be helpful if they could correlate noise emanating from this project related to noise associated with construction projects, motorcycles, emergency vehicles and other noise that is fairly typical in dense	Council-member Petty	*The revised draft HIA Section 5.5.1 acknowledges that project noise emissions during the construction phase will be similar to those expected during other construction activities which are a common occurrence in urban areas.*

Comment	Commenter	Response
living situations. It provides a benchmark that is relevant to people.		
Clark Stadium is so well lit that residents can see it from Prospect in the south part of town. How does the impacts of the lighting from the site compare to this?	Council-member Petty	*The revised draft HIA contains a discussion of baseline lighting conditions (including Clark Stadium) as well as a detailed assessment of Project-related light sources and potential impacts on health. Refer to Section 5.5.2.*
With respect to noise, the HIA concludes: "Increases in nighttime noise during drilling, testing, and production activities will likely change the quality of sleep of nearby residential neighborhoods." (HIA, p. iv.) In support of this statement, the HIA states that according to the World Health Organization, "a noise level increase of 6 to 14 dB A can change the quality of sleep and this is roughly the level of increase projected for nighttime drilling and production activities." (HIA, p. 54.) The draft EIR, however, states that half of the nighttime noise levels are less than 6 dBA, and more importantly, the draft EIR also evaluates whether the resulting noise level is less than the 45 dBA limit in the City's Oil Code, and with mitigation, most of those sites comply with that limit. The HIA improperly selects only certain information from the draft EIR (reports it incorrectly), and does not address the 45 dBA limit or whether this would change its conclusion.	Alston & Bird	*The revised draft HIA Section 5.5.1 evaluates noise increases from the proposed Project in the context of the 45 dBA limit in the City's oil code. Given that the World Health Organization Nighttime Noise Interim Guideline is 55 dBA (with an ideal goal of 40 dBA), the standard set by Hermosa Beach (45 dBA) is considered a sufficient nighttime noise target.*
Plus, noise dissipates as the distance from the source increases, but for some reason, the HIA concludes that noise is "community-wide". No report exists to support the HIA's conclusion that the proposed project would result in noise across the City.	Alston & Bird	*The revised draft HIA Section 5.5.1 evaluates noise emissions separately for the project phases, and therefore separately for the short-term pipeline construction. The geographic extent is specified as "Localized (project Site and along truck and pipeline routes)"*
With respect to pipeline construction and noise, the HIA fails to acknowledge that the noise in any one particular location typically lasts for less than one week, usually two or three days, not four months.	Alston & Bird	*The revised draft HIA Section 5.5.1 states: "According to the EIR, construction of the Pipelines is scheduled to take 17 weeks, with the time in front of any one location limited to approximately 1 week (MRS, 2014)."*
Issue Area: Traffic		
Can they choose an existing oil project and study the impacts of the community's "walkability" factor? As an	Council-member Petty	*The HIA relies on existing research to assess potential health impacts of the proposed project. As far as we know, there are no existing*

Comment	Commenter	Response
example, there is an oil project located in Huntington Beach, among a community. Did that result in lifestyle changes for those residents?		*studies on oil projects in a densely populated area and the effect on community walkability.*
Trucks in Hermosa Beach- what is the current volume of trucks (garbage, etc.) and how does the proposed increase for oil transportation relate to this?	S. McCall	*As described in the HIA, traffic counts were collected on roadway segments of Pier Ave, Valley Drive, and Herondo Street in mid- July 2013 to establish baseline truck traffic in the vicinity of the proposed project Site. A daily average of 55 two and three-axle trucks (e.g., garbage trucks) were counted. No four-(or more) axle trucks were counted. The number of additional truck trips during the proposed project will be as many as 18 three+ axle round truck trips per day. Please see Section 5.6 for the updated traffic assessment in the revised draft HIA.*
Issue Area: Community Livability		
The HIA relies on sources which are not recognized or based on generally accepted scientific principles, or sources which have only a modest connection to the topic considered, and any HIA should utilize tested standards or regulations, or at a minimum, acknowledge that conclusions based on untested or unrelated literature have limited value. For example, with respect to social cohesion, the HIA utilizes sources regarding "social support" – which is not defined or explained and may reflect the support of family and friends rather the psyche of a city.	Alston & Bird	*Unlike for the physical environment, there are few regulatory standards which require consideration of the social and economic determinants of health in the decision-making framework. A key strength of HIA is the ability to fully examine the health consequences of projects by pulling from a wide range of methodologies.* *The revised draft HIA contains an updated assessment of social cohesion with a clearer identification of the sources relied upon and a discussion of the potential difference in interpretation (Section 5.7.5).*
The HIA also states that 'political stress surrounding the impending vote on repealing oil in Hermosa Beach is very present and has already impacted social cohesion in the community.' It seems incredible that such a conclusion could be reached based on a survey of less than 1.5% of the City's population.	Alston & Bird	*The purpose of the online survey conducted during the scoping step of the HIA was to understand the key health concerns related to the proposed project among community members. The survey did not inquire whether or not participants were experiencing stress surrounding the vote.* *A revised assessment of social cohesion and political involvement are provided in the revised draft HIA (Section 5.7).*
Did the avoidance of a potential $700 million damage award against the City provide any social cohesion? That, of course, is not discussed at all.	Alston & Bird	*The draft HIA focuses on potential health impacts of the proposed project and the vote that will occur. A retrospective assessment of health consequences of previous decision-making processes is beyond the scope of this draft HIA.*

Comment	Commenter	Response
		A revised assessment of social cohesion is provided in the revised draft HIA (Section 5.7.5).
The HIA also lacks balance as it takes ample liberties with its many unsubstantiated negative impacts, but is woefully inadequate in its analysis of the substantial positive benefits that could result from the project, as discussed in the Cost Benefit Analysis.	Alston & Bird	*The revised community livability assessment (Section 5.7) provides further details and discussion of potential positive health effects of the proposed Project.*
Has the HIA factored into the popularity and HIGH TRAFFIC nature of the portion of the Green Belt in the "Red Zone" and the # of Hermosa and non-Hermosa residents that pass through the "Red Zone" while using the Green Belt for exercise or recreational purposes? All day long I see Hermosa Valley students going to and from school, Elderly/Children/Infants/Pregnant Women walking on the greenbelt as well as runners and dog walkers enjoying the Greenbelt while passing in front of the projected site. We need to consider the negative impact of having a High Risk Health Impact "Zone Red" will have on the Green Belts popularity. The Green Belt needs to be treated no different than the strand. And what would happen to the # of beach goers if they knew they would be in a health risk area at the beach? Our borders are thin and if you sneeze on the north side you get sick on the south side.	J. Lange	*The close proximity of the Greenbelt and the use of beaches are included in the discussion of community green space in section 5.7.2 of the revised draft HIA.*
Issue Area: Other		
It would be instructive to the community if the health impacts and any proven health issues associated with the Redondo Beach drilling and oil production were studied.	Council-member Petty	*There are no readily available reports of health issues associated with the Redondo Beach drilling, which occurred in the 1950s. Performing original research is beyond the scope of this HIA.*
(**Comment to EIR, CBA, and HIA**) Presentation of findings - can the findings be related to similar projects in other cities (Beverly Hills, Huntington Beach ... USA or outside of the USA)- what are the proportion of 'successful' projects where there have been no issues and the community has been fully supportive, versus 'unsuccessful' projects where disasters have arisen, health issues, etc. Can the finding be more relatable	S. McCall	*The revised draft HIA will relate the E&B proposed project to other projects, when possible. There have been no previous HIAs prepared for this project to use for comparison purposes.* *Findings of the final HIA will be presented to the community and visuals will be used when appropriate.*

Comment	Commenter	Response
both in using visuals of the proposed site and buildings; as well as on matters such as noise, smell, etc. Can the findings be related to the previous time this measure was evaluated and voted on. Can the findings be presented at a public town hall event, with public Q&A.		
For each location listed, in the past 20 (or 10 years), how many hospitalizations and deaths were attributed to site operations?	JD Preletz	*There are no readily available reports quantifying hospitalizations or deaths attributable to site operations for each drilling site in the Los Angeles Basin. Performing this original research is beyond the scope of this HIA.*

Appendix D

Health Impact Assessment Community Survey

Health Impact Assessment Community Survey

Question 1: Where do you live?		
Answer Options	Response Percent	Response Count
Hermosa Beach - North of Pier Ave and West of the PCH	24.4%	66
Hermosa Beach - South of Pier Ave and West of the PCH	44.1%	119
Hermosa Beach - North of Pier Ave and East of the PCH	7.8%	21
Hermosa Beach - South of Pier Ave and East of the PCH	7.0%	19
Manhattan Beach	6.7%	18
Redondo Beach	10.7%	29
Other (please specify)		24
	answered question	270
	skipped question	22

Number	Other (please specify)
1	Torrance
2	Torrance
3	torrance
4	torrance, palos verdes area
5	Torrance
6	Torrance
7	Torrance
8	Torrance
9	This is the ONLY serious question in this survey. Of COURSE everyone is sane enough to be"concerned" about all those things AND nuclear warfare AND rabid dogs. I am CONCERNED about those as well
10	Leimert Park-Baldwin Hills
11	Long Beach
12	Torrance
13	san fernando valley but go to the beach often and the air quality has gone down again
14	Hawthorne
15	Mar Vista, California
16	South Gate
17	Oceanside, Ca
18	Visit my patents there
19	rancho palos verdes
20	[Personal information removed]
21	Lawndale
22	Lakewood
23	Our lives depend on the Bay, no matter wear you live. THE BAY IS NOT FOR SALE.
24	Torrance

Health Impact Assessment Community Survey

Question 2: Are you concerned about how the proposed oil production project could impact you and/or your family's health and quality of life?		
Answer Options	Response Percent	Response Count
Yes	94.2%	274
No	3.8%	11
Not Sure	3.1%	9
	answered question	291
	skipped question	1

Health Impact Assessment Community Survey

Question 3: If you said YES or NOT SURE (to #2), please indicate your level of concern, if any, on the following issues:						
Answer Options	I am very concerned	I am somewhat concerned	I am not concerned	I don't have an opinion	Rating Average	Response Count
Air quality issues (e.g. particulate emissions)	247	26	9	1	1.17	283
Noise	220	39	21	3	1.32	283
Lights	177	63	32	6	1.52	278
Vibration	204	47	25	6	1.41	282
Odor	248	25	8	2	1.17	283
Truck traffic	230	45	6	2	1.22	283
Parking problems	195	58	23	6	1.43	282
Less access to community spaces (e.g., the greenbelt	210	51	16	5	1.35	282
Drinking water contamination	234	30	15	4	1.25	283
Surface water/runoff contamination	244	22	11	3	1.19	280
Potential impacts to the ocean or beach	259	16	10	1	1.14	286
Soil contamination	249	27	8	1	1.16	285
Explosions/Spills/Accidents	254	23	6	1	1.13	284
Earthquakes	207	55	20	2	1.36	284
Land subsidence (sinking)	212	43	16	6	1.34	277
Property values	223	33	19	4	1.30	279
Image of the City	210	41	24	4	1.36	279
Other (please specify)						73
					answered question	286
					skipped question	6

Number	Other (please specify)
1	Effects of discharges into older capped wells. Hydrogen sulfide danger. Evacuation routes. Falling drilling rigs. Cross-contamination from animals and oil workers. Psychological and physiological effects of fear, stress and anxiety. Emotional discord from fractured relationships within the community.
2	I am concerned about potential diversion of limited water resources to the use of oil well drilling and/or potential hydraulic fracturing as is evidenced by the "Will Serve" letter from the West Basin Municipal Water District for 375 acre feet of reclaimed water to the E&B Oil Project, since such water would otherwise be available for other uses such as irrigation, thus placing additional demands on potable water supplies to make up for the potential loss of 375 acre feet of reclaimed water resources. I am further concerned that such added demands on limited water supplies will help support the West Basin Municipal Water District's plan to build a major ocean water desalination facility at the NRG facility in El Segundo.
3	The people already voted NO on oil drilling - - why are we still "talking about it" ???
4	I am concerned about all the ways this project will negatively impact our
5	Global warming: We need to consume less
6	This project would ruin our City in all the above ways. The residents of Hermosa Beach must do everything they can to stop this project to maintain our quality of life now and in the future.
7	Impact on property values
8	i have health concerns and my doctor told me to move if the city moves forward with this proposal.
9	Oil drilling is a great idea and will bring much needed revenue to our city.
10	I support oil drilling.
11	it feels terribly wrong to release these chemicals and dig up the earth
12	I see only major risks and no material benefit to the citizens and property owners of Hermosa Beach. I also invite you to review the Health Impact Assessment for Battlement Mesa Garfield County, CO: http://www.garfield-county.com/public-health/documents/1%20%20%20Complete%20HIA%20without%20Appendix%20D.pdf - which was prepared by 7 individuals who include 2 Medical Doctors, and collectively hold 3 MSPH, 1 PHD, 1 MPH degrees.
13	I am extremely worried about all the above ramifications of oil drilling.
14	I do not live in the immediate areas, but I am concerned for the health and safety and environmental protection----FOR ALL AREAS. Thank You, [Personal information removed]
15	All of the above, plus unknown factors which could potentially show up later in our (and our children's) health.
16	I am concerned about the incidences of hear disease, lung disease and cancer in our community. Will there be a benchmark study that identifies hotspots that then has comparison studies over time?
17	the discussions held so far seem to relate only to how this can be done successfully but without the actual dollar amounts to the city and how my life as a home owner in HB is going to be benefited-so far it is all let us do it and there is money for you.
18	Oil drilling and production is a dirty, noisy and dangerous business and it has no place in such a densely populated town.
19	Quality of life; specifically health risks to all and , in particular , children and elderly, and the potential contamination to the air , ocean and environment
20	Most wonderful beach community south of malibu and north of san onofre. Some of the greatest people in l a county. They're going to put a gargantuan blemish in the south bay and risk the welfare of it's terrific inhabitants lo the entire south bay. Its an unnecessary risk and more important to preserve an already challenged ecosystem.
21	I work for a reconstructive surgeon in Beverly Hills...we have a large number of young women patients living in Manhattan Beach, addresses within 3 miles of the oil plants that have breast cancer. Makes me wonder...because I live here too.
22	With solar energy in almost unlimited supply, doing this is stupidity and greed at work.
23	while certain aspects of the project do not affect me directly, (i.e., noise, lights, vibrations, odor, etc.), I would not want them imposed upon anyone in this community.
24	Final debt incurred by the city due to mismanagement of the whole project.
25	the question is not IF a spill will happen, but WHEN will it happen. Ask the folks in Mayflower, Arkansas. Ask the folks who live along the Gulf of Mexico. Ask the folks who live anywhere near an oil field.
26	we all are affected because the wind comes right over the hill and into all areas and affects all of us
27	Particualte matter is carcinogenic. Air quality...the wind blows east. I have lived in Hawthorne for 60 years and we go to the beach, eat at the restaurants, enjoy the entertainment and shops in HB , MB and RB. Also this is a small planet and what affects one area impacts all of us.
28	Impact to tourism. Do not allow drilling to happen!!

29 I am opposed to the oil industry due to global warming. I believe that oil SHOULD be more expensive, so that we learn to use other fuels. finding more sources of oil is NOT how to save this planet.

30 I am gravely concerned that this project would pose significant risks to our long term health - cancer, asthma, etc. There is no way this project can mitigate my concerns to a reasonable tolerance. Absolutely no way whatsoever.

31 Children playing near trucks

32 I already live close to the Redondo power plant and it's an eye sore. These oil pumps will have the same impact.

33 I BOUGHT MY HOME IN 1984 ON 2ND & VALLEY THE SOLE PURPOSE OF NOT BEING BY IMDUSTRIES SUCH AS THIS. I LIVED THROUGH THE MCPHEARSON NIGHTMARE AND HOPE THE CITY REALISES ONCE AGIN THAT OIL DRILLING IS NOT A GOOD CHOICE FOR HERMOSA BEACH NOW OR EVER!!

34 The oil and gas industry's exemptions to major environmental laws
http://www.shalegas.energy.gov/resources/060211_earthworks_fs_oilgasexemptions.pdf

35 danger of traffic for our kids going to school

36 Children safety with trucks on road

37 Keep that [Expletive] overseas or tap into Alaska!

38 Increased risk for those at high risk for cancer (I have had it 3 times), comprimised immune symptoms, children and infants, respitory issues, seniors.

39 I am concerned that all of the potential health hazards are not even known yet. Companies routinely try to deny that diseases and impacts of any drilling/contamination are their responsibility. It is always blamed on something else or postulated that the amount of poison that is released is so insignificant that there are no health risks associated. Yet we see cancer rates rise, the rates of neurological diseases increase and many other potential health issues that we cannot even predict occur in clusters around these toxic sites. I am very concerned!

40 Suggest "subsidence" be defined as having to do with sinking and not "subsidy".

41 The most important concern are methane blowouts. There are many abandoned wells buried under homes. Do we want to have methane alarms on our homes like Playa Vista? I think not.

42 The city does not have a hospital or clinic in case of an multiple emergency, which is possible when you have this kind of business in a small town. Nor has many ambulances for Transfers to nearby hospitals.

43 [Personal information removed]

44 This community is too small for the amount of oil drilling and the risk is too significant. Too many examples exist of how other communities have been negatively affected. People move to Hermosa Beach to avoid this kind of potential environmental calamity.

45 I am also very concerned about the effect on ocean life. I am not sure if that falls under the umbrella of "ocean or beach," but want to be sure that ocean life is considered.

46 It seems that truck traffic will result in an increased rate of road deterioration (especially on Valley Drive?). The road maintenance costs (and general loss of a traffic route for any road repairs/construction) needs to be well defined & strongly considered for this proposal.

47 I am also concerned about ultimately adding to the amount of carbon dioxide and other greenhouse gases in the atmosphere. We are already facing a crisis produced by the amounts released to date, and they are already having problematic health and economic impacts on the entire planet.

Also, I don't like the idea of changing a "light industrial" area of our tiny city into a heavy industrial area.

48 My only concern is the financial impact to the city and the ME if the oil drilling is not allowed. I have no concerns at all about health issues. My only concern is how the city is going to pay the $17.5M fine if this doesn't pass. I don't want it coming out of my pockets. AND I would rather see the city spend it's money on much needed repairs such as a sewer upgrade. There are so many other areas in the city that need improvement and repair. Let's spend the money where it is needed and NOT on a $17.5M fee if this doesn't pass.

49 Poisonous gas leaks
Disruption due to construction of wells and pipeline

50 Quality of life. Residential should be residential. A peacefull oasis with light industrial warehouses is acceptible. This is my home (right next door) this is my greenbelt and place of refuge. This is going to be unsightly and out of place. The city screwed up on this agreement and they MUST fix it.

51 nosebleeds from children (like the la times story)
blowouts on capped wells
obstructed viewsmfrom tall oil derecs

52 The green belt trail is one of few open space areas for residents, children and visitors. It is also a nesting and hunting habitat for migratory birds, raptors and other species of animals. This industrial site will negatively impact this space,

53 pipeline through Tonga lands, Redondo and Torrance

54 I live close to Hermosa. I already am very concerned about adverse effects of airport, vehicle traffic, and refinery pollution in south bay. If this project happens, I will move my family out of south bay and relocate to San Diego for my job.

55 Will this be a 24 hr /7 days operation, Will the people nearest the drill site if passed be trained and be hired to work there

56 "City" in theory gets richer, but my quality of life deteriorates dramatically.

57 The construction phase will generate noise, traffic and i've heard E&B will need to remove the green belt from 8th street down to 2nd street to allow their tractor trailers with supplies to come in. This phase is ongoing for 2 years and will disrupt my family, children not walking to school and noise. We live on top of 7th street and the wind blows up our street like a wind tunnel and the noise, pollutants and light will come right up our street.

58 It is wrong for the City to ignore the voice of the people in 1995 vote to approve Citizens Initiative , Measure E, which restored a total ban on Oil Projects CITYWIDE. how dare they consider any EIR before a new vote.

59 Exposure to lawsuits from adjacent cities from decreased property values, image of city, etc.

60 Quality of the company Hermosa has signed a deal with. Nobody has done a background check on a company that you are going to enter into a $1 billion+ dollar agreement. Steve Layton is the President of over 9 companies. Has anyone done their due diligence on the various companies he runs? He has documented with the State of California at least 16 spills of 16,000 gallons over 6 years with EB! What about the other companies he runs? I just read about his company in Huntington Beach that may have spilled 700 gallons of oil and may have gas leaks. He has already had major spills and declared bankruptcy. Is

61 methane blowouts of capped wells buried under homes should be #1 on your list. Do your homework!

62 I live a couple of blocks from this site. I am a mother with two small children ages 3 and 4. I am very concerned about their health and their ability to enjoy our neighborhood parks, such as the green belt and South Park, and the beach.

63 Walking and biking safety. Overall traffic not just truck traffic. Regulation of any project being overseen by a government body. Slow poisoning from Toxic Airborne Chemicals. Health Issues like Headaches, Respiratory problems, Nosebleeds, everything from Autism to Alzheimer's but mostly kids being exposed to the very toxic chemicals associated with Oi and Gas Drilling and Production.

64 SAY WHAT? If you live any place in the southbay, all of these are of concern unless you are greedy or brain dead.

65 Cancer, nose bleeds, birth defects

66 Drilling in Hermosa is a bad idea for the city. I would never vote for it

67 long term chronic health issues, potential for further litigation over illness, plus all of the above.

68 Safety for recreation and enjoyment on Valley- baseball field, park, green belt, lawn bowling, farmers market, children walking to/ from school

69 cancer!

70	There are so many potential risks that to even consider this project from a health and quality of life perspective is ludicrous.
71	Effects of inhalation of low level esulfer dioxide and benzene on small children and infants. I live 150 yards due east of the drill site. Will my families rate of cancer and illness increase even 1 percent due to this project.
72	All of it. Everything about this projects scares me
73	Exposure to NORMs (Naturally Occurring Radioactive Material) brought to surface and stored on site during processing. Exposure to toxic chemicals and substances. Psychological issues and effects of stress. Years of construction hassles, street closure, noise, flaring methane.

Health Impact Assessment Community Survey

Question 4: If you said YES or NOT SURE (to #2), please indicate if your level of concern differs based on the phase of the proposed project. If you would like more information on each phase, please refer to Slides 9 through 14 of the EIR presentation: click here						
Answer Options	I am very concerned	I am somewhat concerned	I am not concerned	I don't have an opinion	Rating Average	Response Count
Phase 1 -Site Preparation/Construction (approx. 6-7	237	28	10	4	1.22	279
Phase 2 -Drilling and Testing/Install Production	249	20	7	3	1.15	279
Phase 3 -Final Design and Construction (approx. 16	243	22	10	3	1.18	278
Phase 4 -Drilling, Development and Operations (ongoing	256	16	6	2	1.12	280
After the project ends	232	22	14	4	1.23	272
Other (please specify)						44
					answered question	280
					skipped question	12

Number	Other (please specify)
1	spills happen wherever drilling takes place. end of discussion.
2	Migration of toxic elements and release into environment after leasehold is abandond.
3	If it ever does end!
4	Extremely concerned E&B will not take full financial responsibility for any accidents or damage to property or human life as a result of their prospective drilling without extensive & costly litigation.
5	I am also concerned that should this project be approved, and complete 35 years of oil production, that after the termination of oil production and abandonment of the site by E&B Oil, that the 30 oil production wells and 4 water injection wells will leave an ongoing risk to future generations of South Bay residents through the potential degradation and/or damage by natural forces such as seismic activity, of the capped well bores, which could lead to future gas, oil, contaminated water, and other potential pollutant leakage, blow outs, explosions, spills, and other unintended consequences that would otherwise not exist without these 34
6	The people already voted NO on oil drilling - - why are we still "talking about it" ???
7	This is insanity. This is FRACKING for both olil and natural gas. This is insanity.!
8	I don't want oil drilling period!!! Any phase is a bad phase. We need renewables!!!
9	I am concerned that this proposed project would provide no health or environmental benefits to the city of Hermosa Beach or South Bay region. Hermosa Beach does not NEED the revenue from a project that will ABSOLUTELY have detrimental effects to the image, health, and everyday life in Hermosa Beach and South Bay. The only question is HOW BAD those effects will be. E&B Natural Resources does not provide clear information on their site about the harmful effects of oil production that will be caused by this project (like all oil exploration projects). I hope that the EIA and Health assessment will make those impacts clear to the people of Hermosa Beach. Although not directly related to health, it would be interesting to better understand how this project would effect the efforts of Hermosa Beach to become carbon neutral: http://www.easyreadernews.com/8361/carbon-neutrality-gets-push/
10	I am very opposed to drilling oil in the Santa Monica Bay, especially in Hermosa Beach where I own a home. There is no way we can be assured that there will not be catastrophic consequences from extracting oil from under the ocean floor. We have a beautiful beach and ocean that needs to be preserved.
11	I'm concerned that the crazy people in Hermosa Beach will start a riot if oil drilling is approved. Oil drilling is a great idea for our town. I wish everyone could see that.
12	I support oil drilling.
13	Fear of a catastrophic accident. Ground water contamination. Cancer & other diseases. Collapse of property value. Destruction of our current idyllic quality of
14	Clean up could be hell. Our children & grandchildren will be stuck with this nightmare.
15	what are the system management procedures after the final phase of the project should it go forward?
16	Concerned more agressive oil stimulation/extraction techniques not currently disclosed will be used in the future as the well production decreases. Also concerned about 30 plus capped wells after project ends.
17	Please have some sense people. If this happens it will surely ruin a great place to live and vacation.
18	I suspect all phases of the proposed project will take longer than projected and that operations can be extended past the 35 year lease term. I also think it's unconscionable to allow non-stop drilling operations (24/7) during any phase of the project.
19	This project will despoil the South Bay. PERIOD.
20	PLEASE STOP THE MADNESS
21	We have reached the limit of environmental destruction. STOP. The city should invest in clean, green solar energy. We have the sun....invest in that!
22	This project will be (and has been already) a concern on many levels. Oversight by the City officials, the project specifics and everything in between. I have zero confidence in this company or it's management, nor do I have confidence that the City officials know enough about oil production to effectively oversee this project.
23	I DO NOT WANT OIL DRILLING OF ANY KIND DOWN THE STREET FROM MY HOME.
24	This was already defeated so now they do an end around and try to get it through again because they have the money to do so. When the wants of the financially capable overcome the wants of the majority, we are in trouble.
25	Clean up of site after project ends. The City had to sue Stinnett Oil, the last driller, to clean up the site after they stopped. With the litigation, this took many
26	Who will clean up spills when they occur? Who will pay my medical bills when I or my family becomes sick? Who will provide fresh, safe water for me when mine is contaminated?
27	I am concerned about opening up drilling into Santa Monica Bay, whether it is in Hermosa Beach, Redondo Beach, or Torrance.
28	I could not find any history of exploitation of oil and gas in an area as populated as Hermosa Beach, or many wells concentrated in such a small surface.
29	When will it end?
30	I am not any more concerned about oil drilling than I am about new home construction and associated noise.
31	All phases of the project are of great concern o me and my family. The impacts to the health of the community, the local environment and the surrounding environment (including air, water, soils) is of great concern as well. This report should be shared with residents and government of surrounding communities such as Redondo Bch and Manhattan Bch.
32	I own a house on 8th Street just west of PCH and at night can hear the waves crashing on the beach. It is not loud, but just loud enough to enjoy the sound in the early mornings when cars are not driving along the street. I don't want this sound to be replaced by construction and drilling that will occur 24/7 in Hermosa. Although this project will bring money to Hermosa Beach, it will devalue my home.
33	there are 3600 24hr continuous drilling days allowed in the lease , 120 days for each well, the EIR says they will use 900 days, 30 days per well. This means that 2700 days are 'drill credits' per the lease to be used anytime in the 35 years, this is a health impact and is not even considered in the EIR as proposed. READ THE LEASE.PLEASE if you want to know more possible impacts, like all processes 'known or unknown' if you want a blank chemical check for example.
34	I am very concerned about the project not being cleaned up when production ends.
35	EB is not clear how long and or often the 150' rig will be installed. They said 2 weeks but every year?
36	The guys running E&B could have been in jail for their past failures.

37 I plan to live in Hermosa Beach until I retire. Although, people focus on the immediate environmental impact of the project, I think people tend to forget to ask "What is going to happen to this place, after these guys leave".

38 Lets see, if the people lived here that put this survey together lived here wouldn't they check every box "I am very concerned" ? Inane, our city and our life blood the ocean is NOT for sale

39 Drilling is a bad idea. I will be voting no.

40 I live very close to the proposed sight, [Personal information removed]

41 Health effects for next generations

42 Once the oil is tapped and flows, there is no turning back. the potential for contamination is with us, and it is permanent. I have never seen a pristine oil field recovery.

43 I don't want oil wells of any kind in Hermosa Beach. I don't want any oil or gas pipeline or fracking or any other type of oil drilling or excavation in Hermosa

44 We currently have a zero percent chance of experiencing health or safety issues related to oil drilling in Hermosa. There is no way the inherent dangers posed by oil drilling can be mitigated except to prevent oil drilling from happening at all.

Appendix E

Baseline Health Assessment

Appendix E: Baseline Health Assessment

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1.1 Introduction

The objectives of the baseline health assessment are to establish the current health status of the City of Hermosa Beach (Hermosa) community, and to evaluate whether the current profile of the community reveals vulnerabilities to any of a number of health outcomes. Understanding baseline conditions is particularly important when conducting a Health Impact Assessment because pre-existing conditions can mediate potential health impacts associated with the proposed project. For example, populations with baseline exposure to high levels of air pollutants are more vulnerable to adverse health impacts from additional increases in air pollution.

The methods used in the baseline health assessment are based on the Guide for Health Impact Assessment from the California Department of Public Health (CDPH 2010). According to the CDPH Guide for HIA, the selection of indicators for the baseline assessment should include indicators for health status, as well as indicators for known social, economic, and environmental health determinants, and should reflect priority health issues being addressed in the HIA. Hermosa-specific health indicators are compared to either Los Angeles County (LA County) or the State of California, in that order of preference, depending on which measures were available. By comparing Hermosa data to the same data for a larger geographic region, we were able to characterize the health status in Hermosa relative to expected health status.

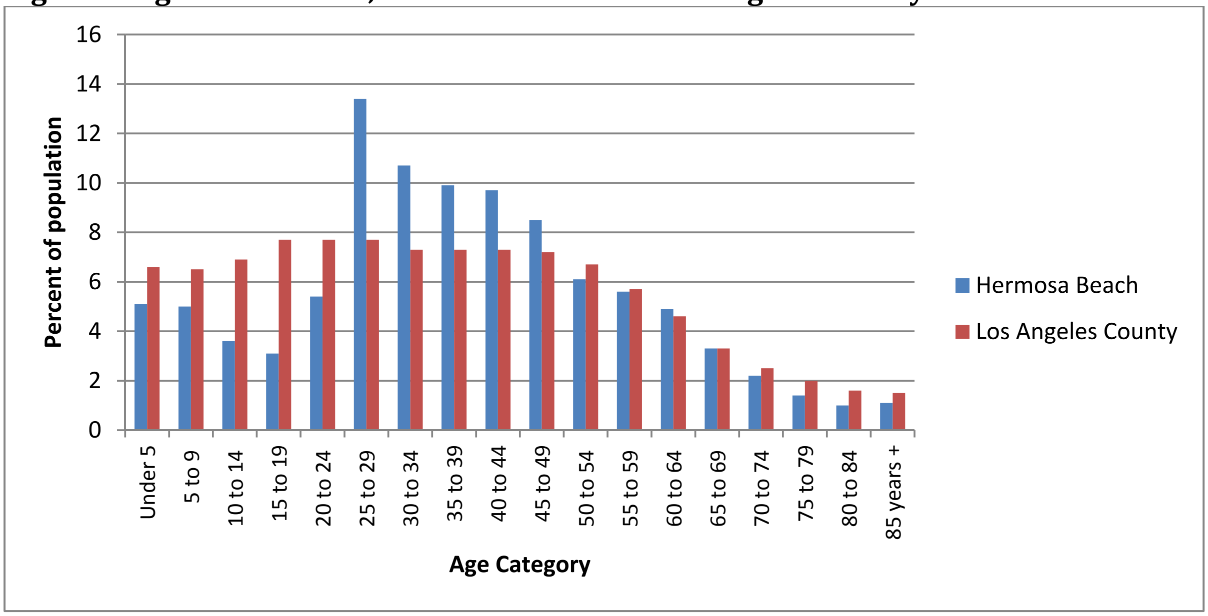
The baseline health assessment focuses on the City of Hermosa Beach, where the majority of the proposed project activities take place. We acknowledge that similar assessments may be valuable for the other impacted communities, due to pipeline construction and truck routes planned through areas of Lawndale and Gardena. However, impacts outside of Hermosa will be limited to shorter periods of the project timeline and baseline health assessments for other cities were outside the scope of this HIA.

1.2 Demographics

Data from the 2010 US Census was used to obtain demographic information for Hermosa Beach and the County of Los Angeles, as a comparison population (US Census 2013). The 2010 population of Hermosa was 19,506 with 52.7 percent male and 47.3 percent female. The age distribution in Hermosa according to five year age categories is compared to the age distribution in Los Angeles County in Figure 1. The most obvious differences between the Hermosa and Los Angeles populations are in the 15 to 19 and 25 to 29 age increments. In Hermosa, the percentage of teenagers ages 15 to 19 is fewer than half the percentage for LA County (3.1% vs. 7.7%), while the percentage of young adults ages 25 to 29 is nearly double the percentage for LA County (13.4% vs. 7.7%).

Age is an important factor in determining vulnerability. According to the census data for Hermosa, approximately 25 percent of the population may be considered to be more vulnerable to certain environmental exposures, based on age (9% over the age of 65 and 16% under 18 years). This is less than the percentage of Los Angeles County residents considered vulnerable to environmental exposures based on age (35%).

Figure 1. Age Distribution, Hermosa Beach vs. Los Angeles County



Source: US Census, 2010

Table 1 below provides both city and county level demographic indicators from the US Census. In the 2010 US Census, 95.8 of residents in Hermosa reported one race: 86.8 percent identified as White, 5.7 as Asian, 1.2 percent as Black or African American, 0.3 percent as American Indian and Alaska Native, 0.2 percent as Native Hawaiian and Other Pacific Islander, and 1.7 percent as some other race. Compared to the County of Los Angeles, Hermosa is much less racially and ethnically diverse. On the county level, 48.2 percent of the population identifies as Hispanic or Latino while in Hermosa, only 8.4 percent of the population identifies as Hispanic or Latino.

Median household income in Hermosa Beach is almost double that of LA County ($102K vs. $56K). Fewer than 4 percent of Hermosa residents live in poverty, compared to 16.3 percent of LA county residents. Nearly 70 percent of Hermosa residents have obtained a bachelor's degree or higher, compared to less than 30 percent in greater Los Angeles County. In contrast to the income profile, the homeownership rate in Hermosa is less than that of LA County (44.9 percent versus 47.8 percent). The homeownership profile is likely explained by Hermosa as a beach tourist destination and an area highly attractive to both renters and leasers. Further, with a median housing unit value over one million dollars, homeownership in Hermosa is over twice as expensive in Hermosa compared to County-wide.

Education level, income, and housing are all components of social determinants of health. Social determinants of health refer to the role that our social environment and economic situation play in shaping our health, as social and economic factors are the single largest predictor of health outcomes, compared to clinical health care, health behaviors, and the

Table 1. Demographic Summary

2010 Census Measures	Hermosa Beach	LA County
Population	19,506	9,818,605
Persons under 18 years, percent	15.9%	23.7%
Persons 65 years and over, percent, 2010	9.0%	11.5%
Female persons, percent	47.3%	50.7%
Race		
White alone, percent	86.8%	71.6%
Black or African American alone, percent	1.2%	9.3%
American Indian and Alaska Native alone, percent	0.3%	1.5%
Asian alone, percent	5.7%	14.5%
Native Hawaiian and Other Pacific Islander alone, percent	0.2%	0.4%
Ethnicity		
Hispanic or Latino, percent	8.4%	48.2%
High school graduate or higher, percent of persons age 25+, 2007-2011	98.5%	76.1%
Bachelor's degree or higher, percent of persons age 25+, 2007-2011	69.9%	29.2%
Homeownership rate, 2007-2011	44.9%	47.8%
Housing units in multi-unit structures, percent, 2007-2011	48.4%	41.9%
Median value of owner-occupied housing units, 2007-2011	$1,000,001	$478,300
Median household income, 2007-2011	$102,289	$56,266
Persons below poverty level, percent, 2007-2011	3.60%	16.30%

Source: US Census, 2010

physical environment (LACDPH 2013). The Los Angeles County Department of Public Health (LACDPH) ranked 117 cities in LA County by economic hardship, using the following indicators: (1) crowded housing, (2) percent of persons living below the Federal poverty level, (3) unemployment, (4) percent of persons over age 25 without a high school education, (5) dependency (percentage of the population under 18 or over 64 years), and (6) per capita income. Based on 2005-2009 data for the indicators listed, LACDPH ranked Hermosa Beach number 1 out of 117 cities, that is, Hermosa Beach was determined to have the least level of economic hardship county-wide.

Overall, demographic indicators show that Hermosa Beach is not highly vulnerable to poor health outcomes traditionally associated with poverty, unemployment, and low educational attainment.

1.3 Current Health Conditions

Information was gathered from various sources to describe the baseline physical health of community members in Hermosa.

1.3.1 Cancer Data

The University of Southern California Cancer Surveillance Program (USC-CSP) is the population-based cancer registry for Los Angeles County that was begun in 1972. By law, all cancers diagnosed in California since January 1, 1988 are reported to one of the regional registries that form the California Cancer Registry (CCR), the legally mandated cancer reporting system of California. The USC-CSP serves as Region 9 of the CCR, and is also one of the registries participating in the National Cancer Institute's Surveillance, Epidemiology, and End-Results Program (SEER). The California Department of Public Health, the Centers for Disease Control and Prevention, and the National Cancer Institute fund cancer surveillance conducted by USC-CSP. Data is collected on all new cancer patients diagnosed in Los Angeles County since 1972 and includes information on age, race/ethnicity, patient's address at diagnosis, gender and specific type of cancer. All invasive cancers, excluding non-melanoma skin cancers, are reported, along with in situ breast and bladder cancer, and benign brain tumors. Completeness of the reporting to the registry is estimated at over 95%.

This analysis, included as Attachment 1, is in response to a request to Dr. Cozen at the USC-CSP for the baseline risk of certain cancers in the City of Hermosa Beach. Cancer types examined are those related to petroleum production (leukemia), common cancers, and cancers identified by community members as being specific concerns. USC-CSP examined the expected and observed incidence of these cancers in the area of concern. The aggregated census tracts examined were: -06037621001, -06037621002, -06037621004, -06037621102, and -06037621104.

As seen in Table 2 below, the observed number of cancer cases in the City of Hermosa was within the expected number, based on age-, race- and sex-adjusted incidence rates for Los Angeles County, for all cancers except melanoma and breast cancer (all races only). The observed number of colorectal cancers was significantly lower in Hermosa than expected. The statistically significant increase in melanoma and breast cancer diagnoses among residents of Hermosa Beach compared to Los Angeles County can largely be explained by known lifestyle risk factors. Higher socioeconomic status is an accepted risk factor for both of these cancers and it is likely that that Hermosa Beach residents have higher income and education than Los Angeles County residents as a whole. In fact, in an extensive analysis across Los Angeles County, when socioeconomic status was accounted for, neighborhood differences in these cancers either disappeared (breast cancer) or were greatly reduced (melanoma)1. In addition, sun exposure is the strongest risk factor for melanoma and thus an excess of diagnoses would be expected in the Southern California beach communities, assuming these residents spend more time in the sun during daylight hours compared to residents elsewhere in the county. Otherwise there is no evidence that residents of Hermosa Beach experience unusually high or low risk of common types of cancer.

Table 2. Expected and observed numbers of cancer cases by type and race in Los Angeles County and Hermosa Beach, 2000-2010

Cancer Type	Race	L.A. County		Hermosa Beach		P_{chisq} [3]
		AAIR[1]	Observed number of patients	Observed number of patients	Expected number of patients[2]	
Hodgkin Lymphoma	White[4]	3.70	1213	5	1-11	0.85
	All Races	2.45	2583	6	0-9	0.40
Non Hodgkin Lymphoma	White[4]	22.27	9250	27	18-39	0.85
	All Races	18.56	17535	30	16-38	0.53
Multiple Myeloma	White[4]	5.35	2326	9	1-12	0.20
	All Races	5.68	5242	11	2-14	0.17
Leukemia: ALL	White[4]	1.75	448	<5	0-5	0.64
	All Races	1.91	2041	<5	0-6	0.92
Leukemia: AML	White[4]	4.01	1654	<5	0-10	0.85
	All Races	3.62	3441	<5	0-10	0.75
Melanoma	White[4]	49.13	19767	114	52-83	<0.0001
	All Races	23.65	22616	122	24-49	<0.0001
Breast Cancer	White[4]	188.03	39893	117	99-143	0.78
	All Races	144.65	75480	148	90-120	0.00036
Prostate Cancer	White[4]	148.27	29250	84	73-112	0.39
	All Races	147.35	60242	107	80-120	0.46
Bladder Cancer	White[4]	24.96	10990	21	17-39	0.19
	All Races	17.80	16117	21	13-32	0.83
Colorectal Cancer	White[4]	53.26	23193	37	47-79	0.0012
	All Races	49.46	45821	41	51-84	0.0016
Brain/nervous system	White[4]	16.74	6495	23	13-33	0.90
	All Races	13.07	12747	23	11-33	0.51

[1]Average annual age-adjusted incidence rates per 100,000 population at risk
[2]Based on Los Angeles County incidence rates and Hermosa Beach population in the years covered
[3]p-value for observed /expected comparison using Chi-square test
[4]Non-Hispanic whites only

1.3.2 Mortality Data

The California Department of Public Health provides mortality counts of the most common causes of death (CDPH 2013a). Mortality data were collected for the most recent two years of data (2009 -2010) for the City of Hermosa Beach and LA County, as a comparison population. Table 3 below shows mortality counts and crude mortality rates based on 2010 Census populations. Rates are unadjusted for age or race because data were unavailable to perform adjustment calculations. The all-cause mortality rate in Hermosa (40.5 deaths per 10,000 people) appears to be lower than the all-cause mortality rate in Los Angeles County (56.9 deaths per 10,000 people). Hermosa mortality rates are also lower for diseases of the heart (9.2 versus 15.8) and cancer (9.0 versus 13.9). While Hermosa appears to have a favorable mortality profile, differences in population age distribution may explain an apparent decreased risk of mortality in Hermosa Beach. For example, age is significantly associated with both heart diseases and cancers, and the

County of Los Angeles has a greater proportion of people age 65 years and older (11.5 percent) compared to Hermosa (9 percent).

Table 3. Mortality Profile in Los Angeles County and Hermosa Beach, 2009-2010

	Hermosa		Los Angeles County	
Cause of Death	No. of deaths	Mortality Rate*	No. of deaths	Mortality Rate*
All causes	158	40.5	111686	56.9
Diseases of the Heart	36	9.2	31076	15.8
Maligant Neoplasms (Cancer)	35	9.0	27294	13.9
Cerebrovascular Disease (Stroke)	8	2.1	6483	3.3
Chronic Lower Respiratory Disease	9	2.3	5712	2.9
Unintentional Injuries	9	2.3	4210	2.1
Alzheimer's Disease	8	2.1	3917	2.0
Diabetes Mellitus	2	0.5	3811	1.9
Influenza and Pneumonia	8	2.1	3979	2.0
Chronic Liver Disease	3	0.8	2345	1.2
Intentional Self Harm (Suicide)	5	1.3	1504	0.8
Essential Hypertension and Hypertensive Renal Disease	2	0.5	1823	0.9
Nephritis, Nephrotic Syndrome, and Nephrosis	5	1.3	1904	1.0
All other causes	28	7.2	17628	9.0

*per 10,000 people. 2009-2010 data from CDPH

1.3.3 Hospitalization Data

The Office of Statewide Health Planning and Development (OSHPD) within the California Health and Human Services Agency provides hospital discharge data records hospitalizations by disease or injury (based on ICD-9 codes) by the geographic area containing the patient's home address (OSHPD 2013). OSHP data for overall hospitalization rate and hospitalization rates for certain common conditions were available for the City of Hermosa Beach zip code. Population statistics from the 2010 census were used in the rate calculation. Table 4 displays Hermosa hospitalization rates next to state-wide rates for comparison to expected rates. Rates are unadjusted for age or race because data were unavailable to perform adjustment calculations. Total hospitalization rate and hospitalization rates for asthma, diabetes, acute myocardial infarction, and mental illness were overall much lower in Hermosa compared to California. The rate of patients categorized as having alcohol-drug abuse/dependence is elevated in Hermosa compared to California. While hospitalization data may indicate higher than expected alcohol and drug use in Hermosa, these results do not allow conclusions to be made about statistical significance.

Table 4. Hospitalizations in California and Hermosa Beach, 2010

Hospitalization Rate in 2010 (rate per 100,000 people)	Hermosa Beach	State of California
Total Hospitalization	7,040[a]	10,660[a]
Asthma Hospitalization	35.9	94.3
Diabetes Hospitalization	15.4	145.6
Acute Myocardial Infarction/Heart Failure Hospitalization	143.5	367.1
Mental Illness Hospitalization	241	551.7
Alcohol-Drug Use and Alcohol-Drug Induced Mental Disease	169.2	109.1

[a]rounded from rates of 70.4 and 106.6 per 1,000 people to estimate rate per 100,000 people
Source: OSHPD from healthycity.org

1.3.4 Birth Outcomes

A birth profile for the Hermosa ZIP code was accessed from the CDPH (CDPH 2013b). The birth profile includes the number of live births (based on the mother's residence at the time of delivery), age of mother, infant birthweight, and trimester during which prenatal care was initiated. Table 5 provides the profile in Hermosa, compared to a reference group of the State of California for the most recent year of available data (2011). Access to prenatal care appears slightly better in Hermosa compared to state-wide; 88% of women in Hermosa received prenatal care in the first trimester versus 82% of women in California. Infants born weighing less than 2,500 grams (about 5.5 pounds) are classified as low birth weight (LBW). LBW is associated with increased risk of later health problems as well as infant mortality. In 2011, 7% of Hermosa births and 7% of California births were considered LBW, representing no difference in the crude rates.

Table 5. Birth Outcomes in California and Hermosa Beach, 2011

		Hermosa Beach		State of California	
		No.	% of births	No.	% of births
Total Births in 2011		203	-	503,856	-
Prenatal Care Trimester	First	179	88%	411,692	82%
	Second	12	6%	65,152	13%
	Third	1	0%	13,537	3%
	None	-	-	2,451	0.5%
Infant Birth weight (grams)	<1500	6	3%	5,817	1%
	1500- 2499	8	4%	28,342	6%
	≥2500	189	93%	469,677	93%
Age of Mother	<20	-	-	38,834	8%
	20-29	20	10%	238,113	47%
	30-34	88	43%	132,886	26%
	35+	95	47%	93,967	19%

Source: CDPH (2013b)

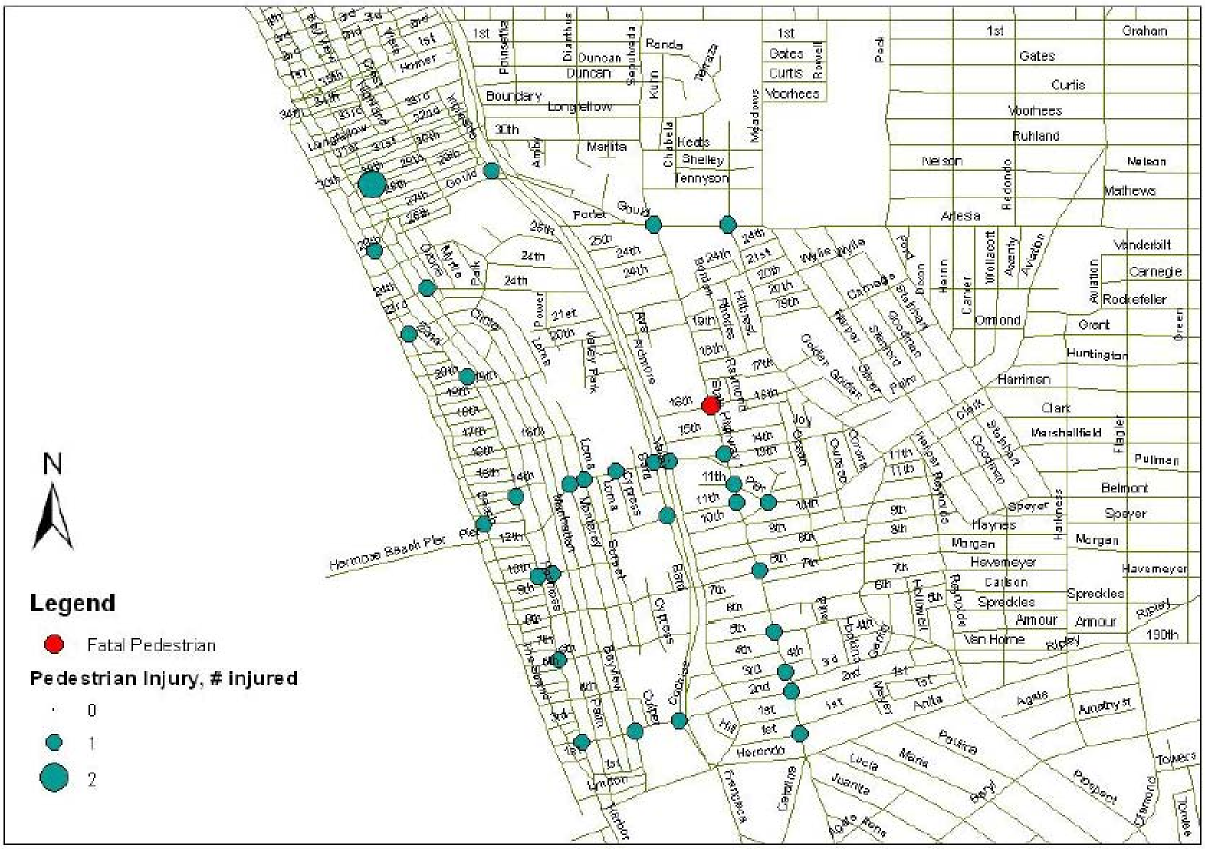
Compared to women statewide, on average, women in Hermosa give birth at an older age. In 2011, nearly half of births in Hermosa (47%) were to mothers age 35 and older; while the majority of births in California were to mothers age 20 to 29 (also 47%). Typically, public health officials are concerned about the risks associated with young maternal age; however, advanced maternal age is also associated with several adverse health outcomes. For example, the risk of having a child with certain developmental conditions, such as autism or Down's syndrome increases as women age (Shelton et al. 2010, Newberger 2000).

1.3.5 Injury from Traffic Collisions

In 2008, the City of Hermosa Beach requested that the Institute of Transportation Studies Technology Transfer Program, the University of California Berkeley, conduct a pedestrian safety assessment (PSA) (Brown and Mitman 2008). The objectives of the study were to improve pedestrian safety and walkability in the City. Compared to California cities of similar size, the California Office of Traffic Safety ranked Hermosa Beach 59 out of 101 for the rate of pedestrian collisions in 2007 (where higher numeric ranks indicate better safety records). Figure 2 shows locations of pedestrian-vehicle collisions over a five year time period (2003 to 2007) and the number of pedestrians injured or killed in each location (there was one pedestrian fatality at PCH and 16th Street which is indicated by the red dot). The map shows there are certain streets where pedestrians are more vulnerable to collision with a vehicle, including PCH, Pier Avenue, Hermosa Avenue, and Beach Drive.

The California Highway Patrol operates the Statewide Integrated Traffic Records System (SWITRS) database that collects data gathered from collision scenes in California (CHP 2014). Custom SWITRS queries were run to view collision data for Hermosa from 2009 through 2011 (see Table 6). The annual number of collisions, injuries, and severe injuries provides important baseline risk of motor vehicle injury due to vehicle-vehicle, vehicle-pedestrian, and vehicle-bicycle accidents. Over the reported time period, the annual number of vehicle-pedestrian collisions ranged from three to ten, the annual number of vehicle-bicycle collisions ranged from six to 14, and the annual number of vehicle-vehicle collisions ranged from 104 to 125. From 2009 through 2011, the number of vehicle-pedestrian collisions appeared to decrease and the number of vehicle-bicycle collisions appeared to increase. While vehicle-vehicle accidents are far more common than vehicle-pedestrian and vehicle-bicycle accidents, pedestrians and bicyclists are more likely to suffer from injuries and severe injuries as a result of the collision compared to motorists or vehicle passengers. There were zero fatalities from any type of collision in Hermosa from 2009 through 2011. Locations of the reported collisions are not available from SWITRS.

Figure 2: Hermosa Beach Pedestrian Collisions, 2003-2008



Source: Brown and Mitman (2008)

Table 6. Motor Vehicle Collisions and Injuries by Type of Collision in Hermosa Beach, 2009-2011

Year	Vehicle Collision w/			Injury Collisions (% of collisions)			No. of Severe Injuries		
	Ped.	Bicycle	Vehicle or Other	Ped.	Bicycle	Vehicle or Other	Ped.	Bicycle	Vehicle or Other
2009	10	6	125	10 (100%)	6 (100%)	36 (29%)	1	1	2
2010	5	10	121	5 (100%)	8 (80%)	40 (33%)	0	0	0
2011	3	14	104	3 (100%)	13 (93%)	44 (42%)	0	2	1

Source: Dept of California Highway Patrol (CHP), 2009-2010

1.3.6 Health Behaviors

Preventable causes of disease are linked with poor diet, physical inactivity, and smoking, and are responsible for nearly 40 percent of yearly mortality in the Unites States (BCHD 2013). The Beach Cities Health District (BCHD) seeks to promote health and prevent diseases in the communities of Hermosa Beach, Manhattan Beach and Redondo Beach. In 2013, the BCHD reported on the health needs in community members. According to the 2013 report:

- 29% of boys and 25% of girls entered local kindergartens overweight or obese during the 2011-2012 school-year.
- Sixty percent of beach cities adults are overweight or obese.
- Two out of five beach cities adults do not meet federal guideline for physical activity.
- Alcohol and drug use in the past 30 days in BCHD 11th graders was 20% higher the 11th graders across the state as a whole.
- 17.4% of Hermosa Beach adults are smokers.

The above statistics on health behaviors in the beach cities show community members may be vulnerable to preventable chronic diseases such as heart disease, cancer, stroke, diabetes, and arthritis (CDC 2009). However, as discussed in Section 1.5, community initiatives seek to actively improve health behaviors in Hermosa and the beach cities.

1.4 ENVIRONMENTAL QUALITY

Existing environmental quality measures from regulatory agency monitoring and reporting, and EIR baseline documents, are summarized in the sections below.

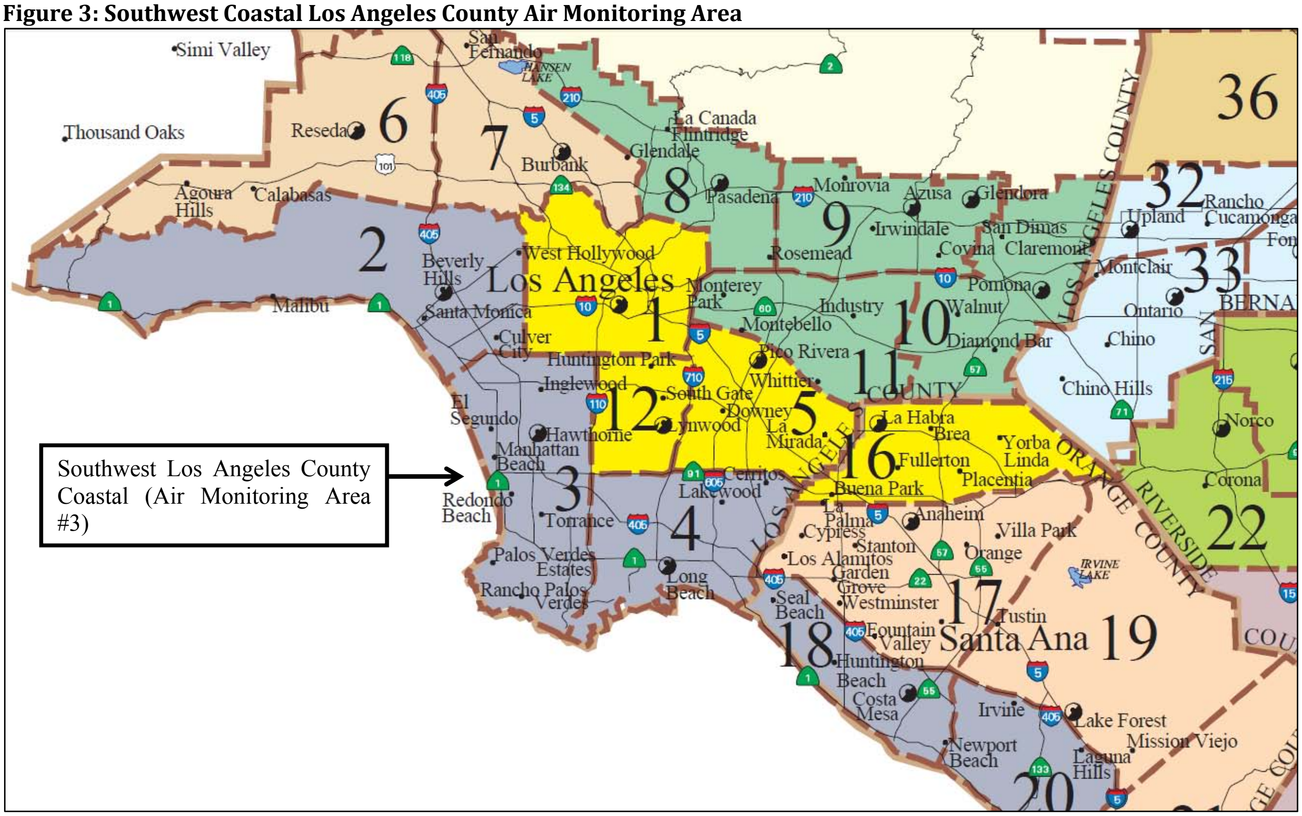
1.4.1 Outdoor Air

Air pollutants, including particulate matter, ozone, nitrogen dioxide, and diesel exhaust can negatively impact human health. For example, asthma is both caused by and worsened by exposure to air pollutants (CDPH, 2010). The South Coast Air Quality Management District (SCAQMD) is the air pollution control agency for all of Orange County and the urban portions of Los Angeles, Riverside and San Bernardino counties. SCAQMD is responsible for determining compliance with state and federal ambient air quality standards within its geographical jurisdiction, and maintains a network of air monitoring stations to accomplish that objective. Air monitoring stations provide data for localized areas around the monitors, though not all individual cities have monitors. Hermosa does not have an air monitoring station within its city boundaries, and is contained in the Southwest Coastal Los Angeles County area (Area 3, Station 820), with an air monitoring station in Hawthorne (see Figure 3).

Table 7 below presents 2011-2012 SCAQMD data on annual average and maximum concentrations of air pollutants, and the applicable regulatory standard, for Southwest Coastal LA County (inclusive of Hermosa Beach) and the reference location of Central LA (SQAMD 2012). Bold concentrations indicate the area exceeded the state and/or federal standard for that pollutant. In 2011, all air pollutants in the Southwest Coastal LA County area were below the regulatory thresholds, except for the annual average of PM10 (21.7 μg/m3) which slightly exceeded the California standard of 20 μg/m3. In 2012, ozone 1-hour and ozone 8-hour maximum concentrations (0.106 and 0.075 ppm, respectively) exceeded the California standards (0.09 and 0.07 ppm, respectively) in Southwest Coastal LA County. In general, air quality in Southwest Coastal LA County tended to be similar or better than air quality in Central LA. Central LA consistently exceeded California standards for particulate matters in 2011 and 2012.

The Southwest Coastal LA County air monitoring station did not sample for particulate matter with a diameter of 2.5 micrometers or less (PM2.5). Particles in this size range can come from many sources including cars and trucks and industrial processes, and can have adverse health effects on the heart and lungs, including lung irritation, exacerbation of existing respiratory disease, cardiovascular effects, and premature death due to cardiovascular effects (heart attacks, stroke, cardiac arrest, and/or congestive heart failure) (USEPA 2012). California's Office of Environmental Health Hazard Assessment (OEHHA) estimated the annual mean of PM2.5 in all California zip codes based on geostatistical methods (ordinary kriging) and using monitoring data for the years 2007-2009. OEHHA estimated Hermosa to have PM 2.5 levels of 13.74 ug/m3. The estimated value exceeds the California standard of 12 ug/m3 (Cal/EPA and OEHHA 2013).

Figure 3: Southwest Coastal Los Angeles County Air Monitoring Area



Source: SCAQMD (2012)

Table 7. Air Quality in Southwest Coastal LA County and Central LA, 2011-2012

		Southwest Coastal LA County		Central LA		Standards	
		2011	**2012**	**2011**	**2012**	**California**	**Federal**
Carbon Monoxide	Max 8-hour (ppm)	1.8	2.5	2.4	1.9	NA	NA
Ozone	Max 1-hour (ppm)	0.078	**0.106**	0.087	**0.093**	0.09	NA
	Max 8-hour (ppm)	0.067	**0.075**	0.065	**0.077**	0.07	0.075
Nitrogen Dioxide	Max 1-hour (ppm)	0.097	0.067	0.109	0.077	0.18	0.1
	Annual average (ppm)	0.0134	0.0104	0.0231	0.0248	0.03	0.053
Sulfur Dioxide	Max 1-hour (ppm)	0.012	0.0049	0.02	0.0052	0.25	0.075
PM10	Max 24-hour (µg/m3)	41	31	**55**	**80**	50	150
	Annual average (µg/m3)	**21.7**	19.8	**29**	**30.2**	20	NA
PM2.5	Max 24-hour (µg/m3)	--	--	**49.3**	**58.7**	NA	35
	Annual average (µg/m3)	--	--	**13**	**12.5**	12	12
Lead	Max. monthly average (µg/m3)	0.008	--	0.012	--	1.5	NA
Sulfate	Max 24-hour (µg/m3)	5.9	--	8	--	25	NA

Bold text indicates exceedance of federal and/or state standard

-- pollutant not monitored; N/A : no current standard; ppm= parts per million; µg/m3 = micrograms per cubic meter

Source: SCAQMD 2011-2012

The elevated levels of particulate air pollution in the vicinity of Hermosa Beach (PM 2.5 and PM 10) are likely related to traffic density in the region. The California Environmental Health Tracking Program generated data on traffic density by zip code based on the sum of traffic volumes adjusted by road segment length (vehicle-kilometers per hour) divided by total road length (kilometers) within 150 meters of the ZIP code boundary. Figure 4 is a map of traffic density for zip codes in Los Angeles County, pointing out Hermosa. In general, the entire Los Angeles area has high traffic density; Hermosa has slightly less traffic density compared to those areas located adjacent to freeways but has heavily trafficked roads (Cal/EPA and OEHHA 2013).

To provide current emission source estimates for the local area around the proposed project site, the Community Air Pollution Information System (CHAPIS) was used to map emission sources. CHAPIS reports emission inventory statistics for a 4 x 4 kilometer grid around the project site, which includes the combined contribution of emissions from cars and trucks, along with industrial sites. While these emission estimates are modeled and are not the same as actual exposure, they provide a point of reference for ambient conditions in Hermosa Beach.

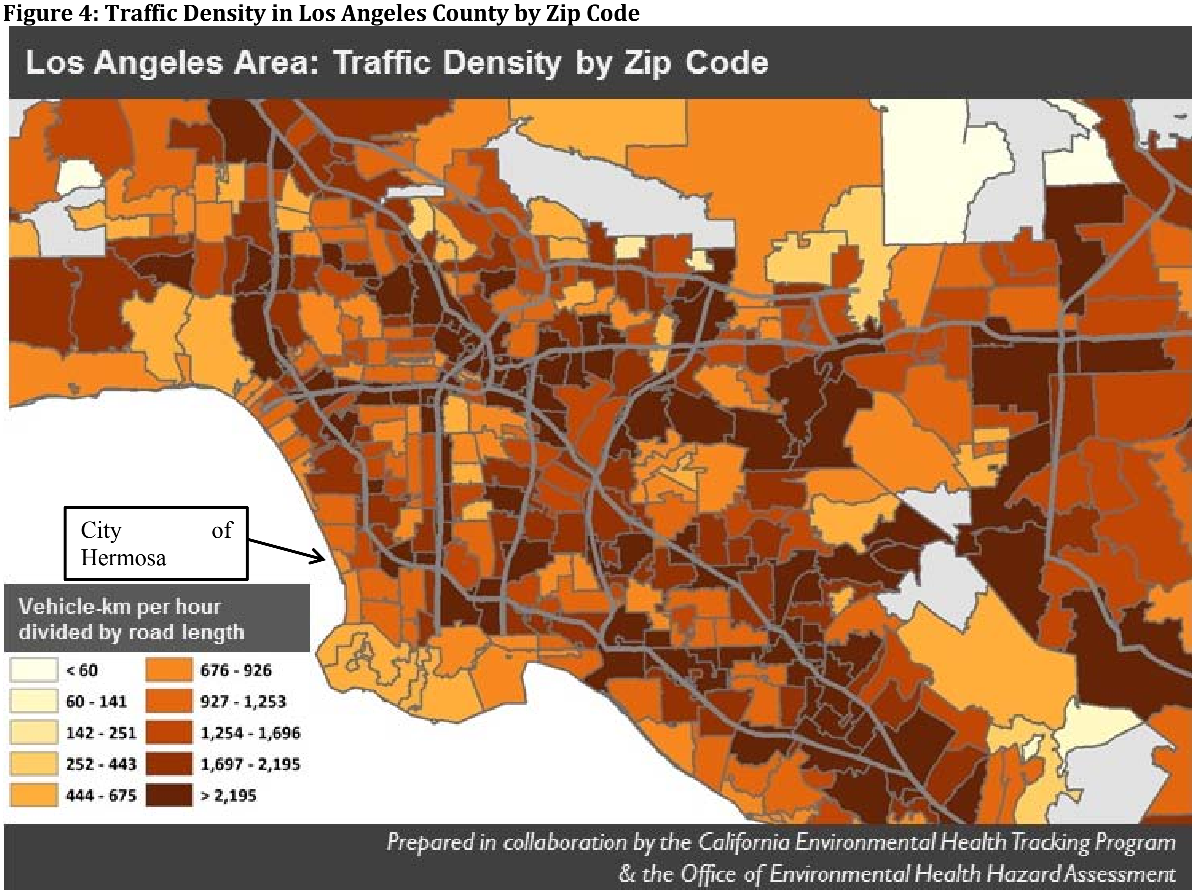
- Current nitrogen oxide emissions in the project site vicinity are estimated to range from 0 to 529 tons per year. The only industrial source of nitrogen oxide emissions within one mile radius is the AES Redondo Beach power plant facility, which contributes 44% of the total nitrogen oxide emissions. Cars, trucks, boats and other recreational vehicles account for 51% of nitrogen oxides in the local Hermosa Beach area (see Appendix E).
- PM_{10} emissions in the local Hermosa Beach area range from 0 to 225 tons per year, with the majority of these emissions coming from the AES Redondo Beach power plant facility. The total PM_{10} emissions in the 4 km^2 area around the site is 270 tons per year (see Appendix E).
- Benzene emissions in the local Hermosa Beach area range from 0 to 7150 pounds per year, and the majority of benzene emissions are attributed to on-road mobile sources such as cars and trucks. The total benzene emissions in the 4 km^2 area around the site is 38,700 pounds per year (see Appendix E).

CHAPIS does not report emissions inventory gridded mapping for $PM_{2.5}$, PAHs or hydrogen sulfide.

1.4.2 Noise

Elevated noise exposure can have an effect on stress, hypertension, blood pressure, and heart disease. As described in the draft Environmental Impact Report (EIR), baseline noise monitoring was conducted during August and September 2013 (MRS 2013). Noise monitoring captured existing weekday and weekend noise conditions at monitoring locations around the proposed project site (6th St. and Cypress, 634 Loma St., 730 Cypress St., 526 8th St., 600 6th St., Veterans Parkway). Table 8 shows the overall average L_{eq} at each sampling location around the project site, during daytime and nighttime hours on weekday and weekends. The equivalent sound level, L_{eq} is the average noise level over the period of time, reported in dBA, or A-weighted decibel to approximate human sensitivity to sound. The daytime L_{eq} around the project site ranged from 51.5 to 61.2 dBA and the nighttime L_{eq}

Figure 4: Traffic Density in Los Angeles County by Zip Code



Source: Cal/EPA and OEHHA (2013), http://www.ehib.org/page.jsp?page_key=980 around the project site ranged from 46.5 to 58.5 dBA. Typical noise levels in an urban outdoor environment are approximately 65 dBA during the day and approximately 45 dBA during the night (MRS 2013). Daytime L_{eq} levels are within typical noise levels and nighttime L_{eq} levels are within 16 dBA of typical noise levels. Of the five measurement locations, the location on 526th 8th Street is the highest for daytime or nighttime.

Table 8. Summary of Existing Noise Levels Around the Project Site (Overall Average L_{eq})

	Overall Average L_{eq} Monday - Friday		Overall Average L_{eq} Saturday & Sunday	
Monitoring Location	**Daytime (8am -7pm)**	**Nighttime (7pm - 8 am)**	**Daytime (8am -7pm)**	**Nighttime (7pm - 8 am)**
6th Street & Cypress	61.2	53.0	58.0	52.2
634 Loma Dr.	55.8	48.8	51.5	47.0
730 Cypress St.	58.9	48.5	53.0	48.0
526 8th Street	63.6	58.5	63.3	58.3
600 6th Street	60.6	54.2	57.6	50.8
Veterans Parkway	56.4	47.8	52.1	46.5

All levels reported in dBA
Table adapted from EIR Table 4.11-5 (MRS 2013)

1.4.3 Surface Water

The City of Hermosa has 2 miles of beach within the larger Santa Monica Bay. The Santa Monica Bay stretches north to Malibu and south to Palos Verdes Peninsula. The entire Santa Monica Bay and its beaches were listed as impaired under Section 303(d) of the Clean Water Act because the surface waters do not meet federal water quality standards. Impairments in the Santa Monica Bay are due to the human health risks associated with consumption of aquatic life due to contamination from DDT and PCBs, and the recreational health risks due to the presence of coliform bacteria (USEPA Region 9 2012).

Impairments associated with DDT and PCBs are related to historic release of DDT and PCBs on the Palos Verdes shelf between 1937 and the 1980s, consisting of approximately 110 tons of DDT and 10 tons of PCBs. DDT and PCBs are non-petroleum related compounds which were previously used at high levels before the US banned DDTs in 1972 and PCBs in 1979. Due to the bioaccumulation of DDT and PCBs in aquatic tissues, the State of California issued its first interim seafood consumption warnings in 1985. Communities of lower socioeconomic status generally depend on fish provided by nearby surface waters to a greater extent than the general population (NEJAC, 2002). Hermosa community members who regularly consume fish from the Santa Monica Bay may have increased exposure to DDT and PCBs.

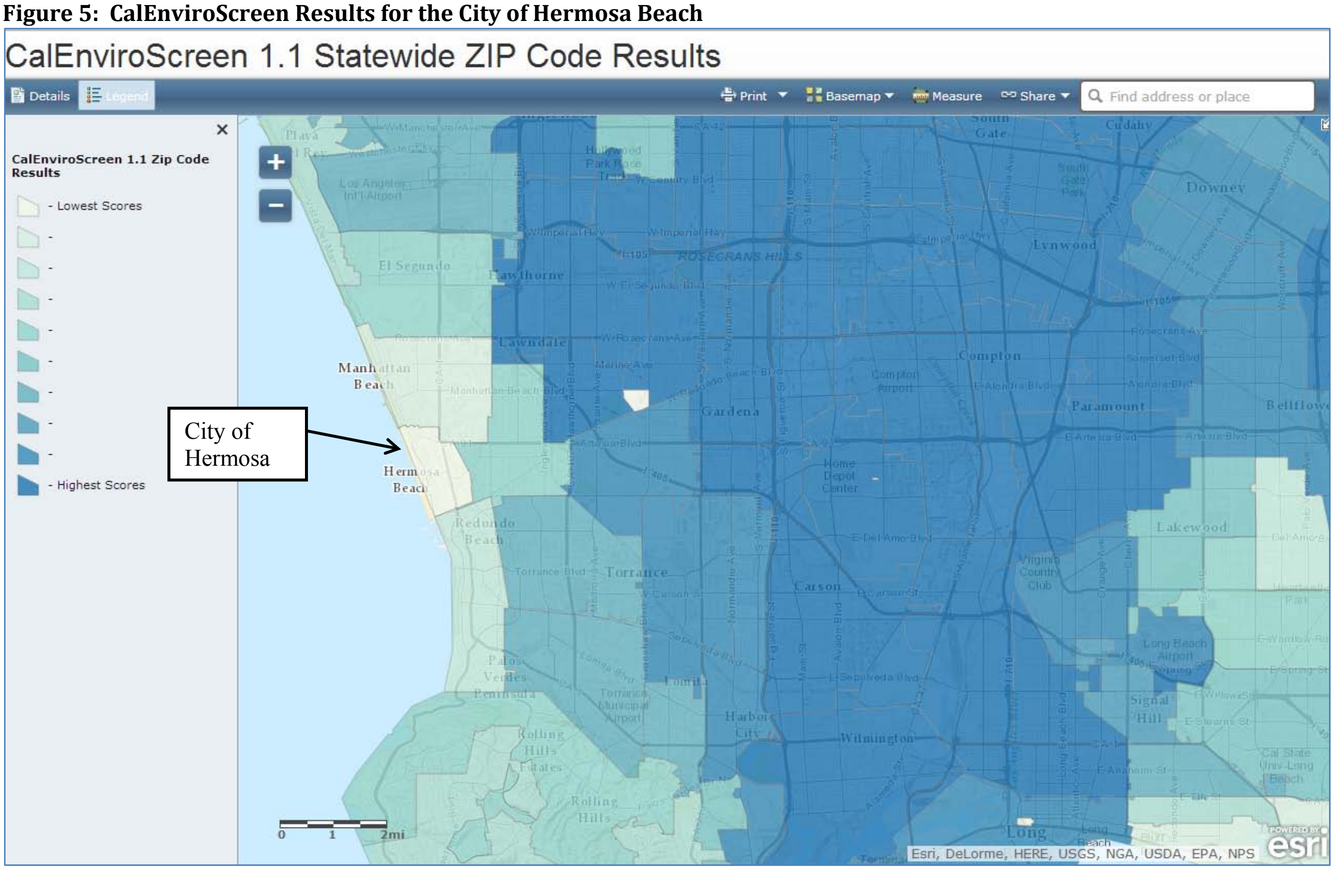
The presence of coliform bacteria in the Santa Monica Bay is an indicator that water quality may not be sufficient to use waters for human body recreation. To address the problem of bacteria in the water, the Los Angeles Regional Water Quality Control Board established the Santa Monica Bay bacteria Total Maximum Daily Load (TMDL) in 2003. The TMDL requires cities to improve water quality through compliance with targets for bacteria in surface water. The City of Hermosa Beach's stormwater pollution prevention program is a multifaceted program designed to reduce runoff and ensure compliance with the TMDL. Efforts of the Hermosa stormwater pollution prevention program include infiltration projects, low flow diversion to sanitary sewer, and a grease control ordinance (SBSP 2013).

1.4.4 EnviroScreen

The California Environmental Protection Agency (Cal/EPA) and the California Office of Environmental Health Hazard Assessment (OEHHA) released a California Communities Environmental Health Screening Tool, Version 1.1 in September 2013, known as CalEnviroScreen (Cal/EPA and OEHHA 2013). CalEnviroScreen is an online mapping application that can be used to identify California communities that are disproportionately burdened by multiple sources of pollution. The tool uses existing environmental, health, demographic and socioeconomic data to create an overall screening score for zip codes across the state. Various secondary data sources are used by CalEnviroScreen, including air monitoring data previously discussed in Section 1.3.1.

An area with an overall high score would be expected to experience much higher impacts than areas with low scores. Figure 5 shows the CalEnviroScreen map for Hermosa and the surrounding communities. The light color for Hermosa indicates that Hermosa was in the 1st to 10th percentile for lowest EnviroScreen scores, indicating an overall low pollution burden in Hermosa Beach relative to other communities in California. Even compared to the adjacent communities of Manhattan and Redondo, Hermosa has the lowest score. The map clearly depicts that communities to the east of the coastal zone suffer much greater pollution burden.

Figure 5: CalEnviroScreen Results for the City of Hermosa Beach



Source: Cal/EPA and OEHHA (2013). http://oehha.ca.gov/ej/ces11.html

The specific pollution burden measures that went into the overall score for Hermosa are summarized below:

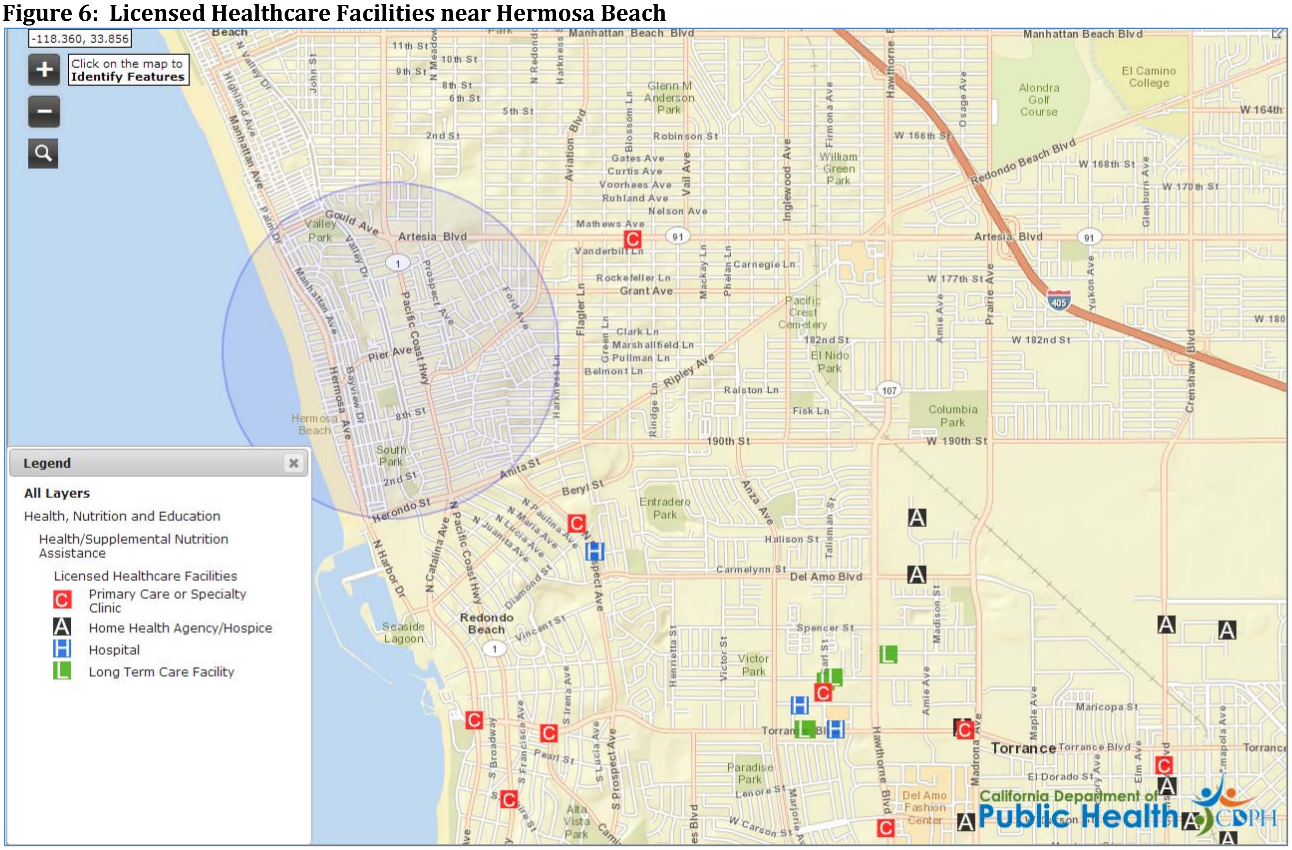
- Annual portion of the daily maximum 8-hour ozone concentration over the federal standard of 0.075 ppm: 0% (0 percentile)
- Annual mean concentration of PM2.5: 13.74 (81st percentile)
- Diesel particulate matter estimated emissions from on- and off-road sources for a July 2010 weekday: 3.73 kg/day (40th percentile)
- Total pounds of pesticide ingredients used in production agriculture per square mile: 0 lbs (0 percentile)
- Total toxicity-weighted pounds of chemicals released on-site to air or water from facilities in or near the ZIP code: 0 lbs (0 percentile)
- Sum of traffic volumes adjusted by road segment length divided by total road length within 150 meters of the ZIP code boundary: 872.3 (58th percentile)
- Number of cleanup sites (due to the presence of hazardous substances) in the ZIP code: 0 (0 percentile)
- Weighted sum of sites posing a risk to groundwater in the ZIP code (underground storage tanks, industrial sites, dry cleaners, etc.): 5 (7th percentile)
- Weighted sum of permitted hazardous waste facilities and hazardous waste generators in the ZIP Code: 0.8 (38th percentile)
- Number of pollutants across all water bodies designated as impaired in the ZIP code: 6 (64th percentile)
- Weighted sum of solid waste sites and facilities: 0 (0 percentile)

1.5 ACCESS TO HEALTH SUPPORTING RESOURCES

Health supporting resources such as health care services and the availability of nutritious foods are important indicators for various health conditions in communities. Spatial depictions of resources in an area may suggest causal hypotheses about health outcomes. For example, the absence of supermarkets (i.e., fresh foods) in an area may indicate that people have to rely on fast-food chains and convenience stores selling only high calorie processed junk foods, putting populations at greater risk for diet-related health problems (CDPH 2013a). The Network for Healthy California, a mapping application that allows users to query and view health supporting resources spatially across California, provides some of this information for Hermosa Beach (CDPH 2013c).

Figure 6 shows the locations of licensed healthcare facilities near the area surrounding Hermosa. Facility types include hospitals, clinics, home health agencies, and long term care facilities (facility address information is maintained and provided by the Office of Statewide Health Planning and Development). The map depicts a one-mile buffer around the City center, and shows that there are no licensed healthcare facilities within the City of Hermosa or with the areas of the one-mile buffer zone. However, if that zone is expanded to 5-miles, there are many facilities, mostly located in the City of Torrance (9 primary care clinics, 13 home health agencies, 4 hospitals, and 5 long-term care facilities). For those community members who do not own a vehicle, it may be challenging to access health care since there are no facilities directly within Hermosa.

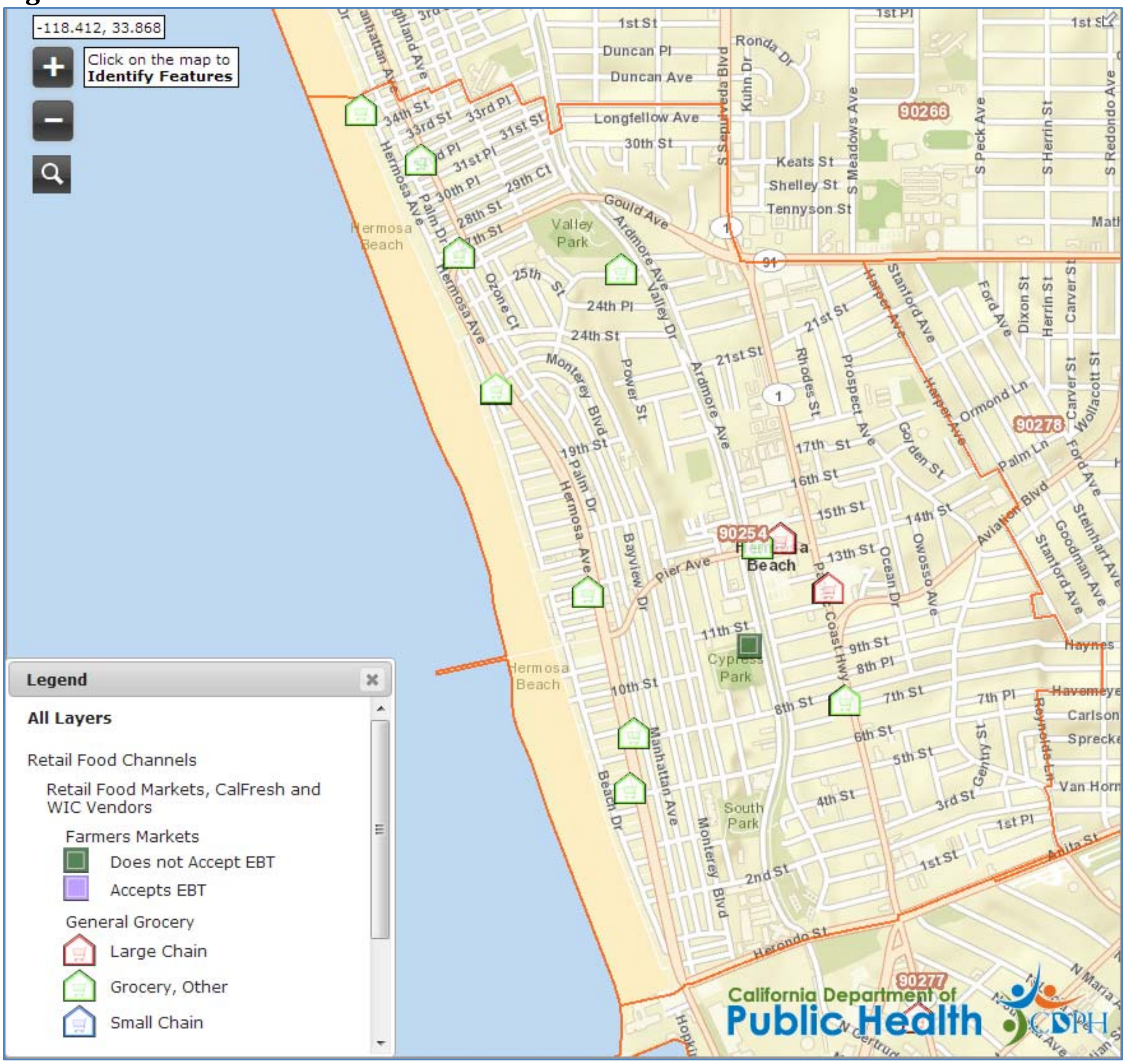
Figure 6: Licensed Healthcare Facilities near Hermosa Beach



Source: http://gis.cdph.ca.gov/cnn2.0/cnn.html?mapid=5908695

Figure 7 shows the locations of grocery stores and farmers markets in the City. There are two large chain groceries, ten other groceries, and one farmer's market within the zip code of 90254. Therefore, there does not appear to be a barrier to access fresh foods in Hermosa Beach.

Figure 7: Groceries and Farmers Markets in Hermosa Beach



Source: http://gis.cdph.ca.gov/cnn2.0/cnn.html?mapid=7032543

1.6 COMMUNITY HEALTH PROMOTION

The City of Hermosa Beach and its community members are exceptionally committed to an outdoor lifestyle and making their environment a healthy place to live. In 2010, the Beach Cities Health District joined the Blue Zones Project™ initiative to create a beach cities community that is healthier and more walkable, bikeable, and socially engaged. Blue Zones uses the Gallup-Healthways Well Being Index™ to benchmark the well-being of the beach cities and measure progress (Blue Zones 2010).

The baseline survey of 1,332 Beach Cities residents was conducted in 2010. Among its major findings was that the overall well-being rating for residents of Hermosa, Manhattan and Redondo was higher than the California average and above the top tier of other cities. More than 90 percent of local residents said they had access to health care, health insurance and enough money for food, shelter and other basic needs. Two-thirds were found to be "thriving." However, the survey also found that 46 percent of the Beach Cities residents felt stressed for most of the day, a number that ranked them 176th out of 188 communities surveyed. When asked if they had significant worries, 37 percent said they did, which ranked the Beach Cities 177th out of those 188 communities surveyed (Blue Zones 2010).

In February 2013, the City of Hermosa Beach became the first community in the country to achieve Blue Zones Community Policy designation – for adopting policies to improve its residents' well-being. Those policies included a "Living Streets Policy" focused on making the community more liveable, walkable, and bikeable (e.g., Pier Ave); and an action to create a community garden. Since the 2010 program launch in the Beach Cities Health District, more than 15,000 people and 75 businesses and restaurants in Hermosa, Manhattan and Redondo Beaches have adopted healthier practices, and the cities have adopted policies that promote walkable and bikeable streets. After the first two years (2010-2012) of commitment to the Blue Zones initiative, Gallup-Healthways Well-Being Index found that across the Beach Cities Health District:

- Obesity dropped 14 percent with an estimated 1,645 fewer obese adults. Lost pounds translate to $2.35 million in healthcare-related savings for Beach Cities businesses and residents over two years.
- Smoking rates declined more than 30 percent or 3,484 fewer smokers. This decrease equates to $6.97 million in healthcare-related savings between 2010 and 2012.
- Exercise rates increased by more than 10 percent as more people reported exercising at least 30 minutes three times per week.
- Healthy eating habits improved 9 percent with more people reporting eating five-plus servings of fruits and vegetables four or more days in the past week.
- Stress indicators remained largely unchanged.

In 2012, the City of Hermosa Beach launched the Healthy Air Hermosa public education campaign to ensure residents and visitors can enjoy a smoke-free environment in public outdoor gathering spots such as the Pier, the Strand, the Greenbelt, Pier Plaza, City owned parking lots, and all parks. Smoking was previously banned on the beach in city buildings and inside restaurants (City of Hermosa Beach 2012).

1.7 LIMITATIONS

Some limitations of this baseline health assessment are as follows:

- The small population in Hermosa Beach made it difficult to find data specific to the City. For example, while information hospitalizations due to asthma were presented, asthma rates for Hermosa Beach were not available. Prevalence of asthma in Hermosa Beach, particularly in children, could be affected by increases in air pollution due to the proposed project. The lack of more specific asthma information is a significant data gap in this assessment.
- Where prevalence and mortality data was available for Hermosa Beach, it was not presented according to categories of race, age, gender, etc. Therefore, rates could not be adjusted for appropriate comparison to either LA County or the State of California.
- In addition, small numbers did not allow making statistical comparisons to other geographic locations.
- The pedestrian safety assessment was conducted over five years ago and many improvements have taken place since then, including the Pier Avenue streetscape improvements. However, other streets have not undergone similar pedestrian improvements since then.
- Ambient air pollution data were available for the Southwest Coastal region, which includes Hermosa Beach but also includes the Los Angeles international airport and other facilities (i.e., the El Segundo refinery) considered sources of air pollution. Therefore, the aggregate data may not be representative of the local Hermosa community.

1.8 CONCLUSIONS

The objectives of the baseline health assessment were to establish the current health status of Hermosa Beach community members, and to evaluate whether the current profile of the community reveals vulnerabilities to any of a number of health outcomes. The major findings of this baseline health assessment include:

- According to the census data for Hermosa Beach, approximately 25 percent of the population may be considered to be more vulnerable to certain environmental exposures, based on age (9% over the age of 65 and 16% under 18 years).
- Overall, demographic indicators show that Hermosa Beach is not highly vulnerable to poor health outcomes traditionally associated with poverty, unemployment, and low educational attainment.
- The observed number of cancer cases in the City of Hermosa was within the expected number, based on age-, race- and sex-adjusted incidence rates for Los Angeles County, for all cancers except melanoma and breast cancer. The statistically significant increase in melanoma and breast cancer diagnoses among residents of Hermosa Beach compared to Los Angeles County can largely be explained by known lifestyle risk factors.

- Hermosa Beach appears to have a favorable mortality profile, according to all-cause mortality, diseases of the heart, and cancer, compared to LA County.
- Hospitalization rates for asthma, diabetes, acute myocardial infarction, and mental illness were overall much lower in Hermosa Beach compared to California. Hospitalization data may indicate higher than expected alcohol and drug use in Hermosa.
- In 2011, nearly half of births in Hermosa Beach (47%) were to mothers age 35 and older; indicating a potential vulnerability to certain developmental conditions, such as autism or Down's syndrome.
- Pedestrians may be vulnerable to injury or mortality along the PCH, Hermosa Avenue, and Beach Drive.
- Beach Cities Health District statistics on obesity, physical activity, and alcohol, drug and tobacco use show community members are vulnerable to preventable causes of chronic illness.
- Elevated levels of particulate air pollution in the vicinity of Hermosa Beach (PM 2.5 and PM 10) put community members at increased risk for respiratory and cardiovascular effects. Traffic density is likely a significant contributor to particulate air pollution.
- Daytime L_{max} levels are within 10 dBA and nighttime L_{max} levels are within 23 dBA of typical noise levels. The location on 526th 8th Street is the highest for daytime or nighttime.
- Hermosa Beach, located on the Santa Monica Bay, has impaired surface waters due to contamination from DDT and PCBs, and the presence of coliform bacteria.
- Compared to other California communities, Hermosa Beach has a low pollution burden from cumulative environmental sources such as ambient air, pesticide use, chemical releases, traffic, hazardous substances cleanup sites, risk to groundwater, permitted hazardous waste facilities, surface water pollutants, and solid waste sites.
- For those community members who do not own a vehicle, it may be challenging to access health care since there are no facilities directly within Hermosa Beach.
- Nearly half of Beach City Health District residents report being stressed.
- Hermosa's commitment to an outdoor healthy lifestyle is exemplified through progress on the Blue Zones Project initiative and smoke-free public areas.
- Future analysis can utilize data presented in this report to evaluate any changes or trends.

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ATTACHMENT 1
USC Baseline Cancer Assessment

Keck School of Medicine of USC

USC Cancer Surveillance Program
Department of Preventive Medicine

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January 10, 2014

Dear Ms. Souweine

You requested information about the risks from cancer (Hodgkin lymphoma, non-Hodgkin lymphoma, multiple myeloma, leukemias, melanoma, breast cancer, prostate cancer, bladder cancer, colorectal cancer, cancers of the brain and other nervous system) in Hermosa Beach compared to the County of Los Angeles as a whole. You provided us with 2010 census tracts 6210.01, 6210.02, 6210.04, 6211.02, 6211.04 and 2000 census tracts 6210.01, 6211.01, 6211.02.

We are pleased to provide the following information in response to the request (Table 1, next page). The observed number of cancer cases was within the expected number, based on age-, race- and sex-adjusted incidence rates for Los Angeles County, for all cancers except melanoma and breast cancer (all races only). The statistically significant increase in melanoma and breast cancer diagnoses among residents of Hermosa Beach compared to Los Angeles County can largely be explained by known lifestyle risk factors. Higher socioeconomic status is an accepted risk factor for both of these cancers and it is likely that that Hermosa Beach residents have higher income and education than Los Angeles County residents as a whole. In fact, in an extensive analysis across Los Angeles County, when socioeconomic status was accounted for, neighborhood differences in these cancers either disappeared (breast cancer) or were greatly reduced (melanoma)[1]. In addition, sun exposure is the strongest risk factor for melanoma and thus an excess of diagnoses would be expected in the Southern California beach communities, assuming these residents spend more time in the sun during daylight hours compared to residents elsewhere in the county. Otherwise there is no evidence that residents of Hermosa Beach experience unusually high or low risk of common types of cancer.

This information is provided on behalf of the Los Angeles County Cancer Surveillance Program and the California Cancer Registry. We will be happy to respond further to additional questions.

Sincerely,

Wendy Cozen

Wendy Cozen, D.O., M.P.H.
Professor, Departments of Preventive Medicine and Pathology
Cc: Dennis Deapen, Dr.PH., Thomas Mack, M.D., M.P.H., Amie Hwang, Ph.D., Cyllene Morris, Ph.D.

[1]Mack TM, Cancers in the Urban Environment, Elsevier Academic Press, San Diego, California, 2004.

Table 1. Expected and observed numbers of cancer cases by type and race in Los Angeles County and Hermosa Beach, 2000-2010.

Cancer Type	Race	L.A. County		Hermosa Beach		P_{chisq} [3]
		AAIR[1]	Observed number of patients	Observed number of patients	Expected number of patients[2]	
Hodgkin Lymphoma	White[4]	3.70	1213	5	1-11	0.85
	All Races	2.45	2583	6	0-9	0.40
Non Hodgkin Lymphoma	White[4]	22.27	9250	27	18-39	0.85
	All Races	18.56	17535	30	16-38	0.53
Multiple Myeloma	White[4]	5.35	2326	9	1-12	0.20
	All Races	5.68	5242	11	2-14	0.17
Leukemia: ALL	White[4]	1.75	448	<5	0-5	0.64
	All Races	1.91	2041	<5	0-6	0.92
Leukemia: AML	White[4]	4.01	1654	<5	0-10	0.85
	All Races	3.62	3441	<5	0-10	0.75
Melanoma	White[4]	49.13	19767	114	52-83	<0.0001
	All Races	23.65	22616	122	24-49	<0.0001
Breast Cancer	White[4]	188.03	39893	117	99-143	0.78
	All Races	144.65	75480	148	90-120	0.00036
Prostate Cancer	White[4]	148.27	29250	84	73-112	0.39
	All Races	147.35	60242	107	80-120	0.46
Bladder Cancer	White[4]	24.96	10990	21	17-39	0.19
	All Races	17.80	16117	21	13-32	0.83
Colorectal Cancer	White[4]	53.26	23193	37	47-79	0.0012
	All Races	49.46	45821	41	51-84	0.0016
Brain/nervous system	White[4]	16.74	6495	23	13-33	0.90
	All Races	13.07	12747	23	11-33	0.51

[1]Average annual age-adjusted incidence rates per 100,000 population at risk

[2]Based on Los Angeles County incidence rates and Hermosa Beach population in the years covered

[3]P-value for observed /expected comparison using Chi-square test

[4]Non-Hispanic whites only

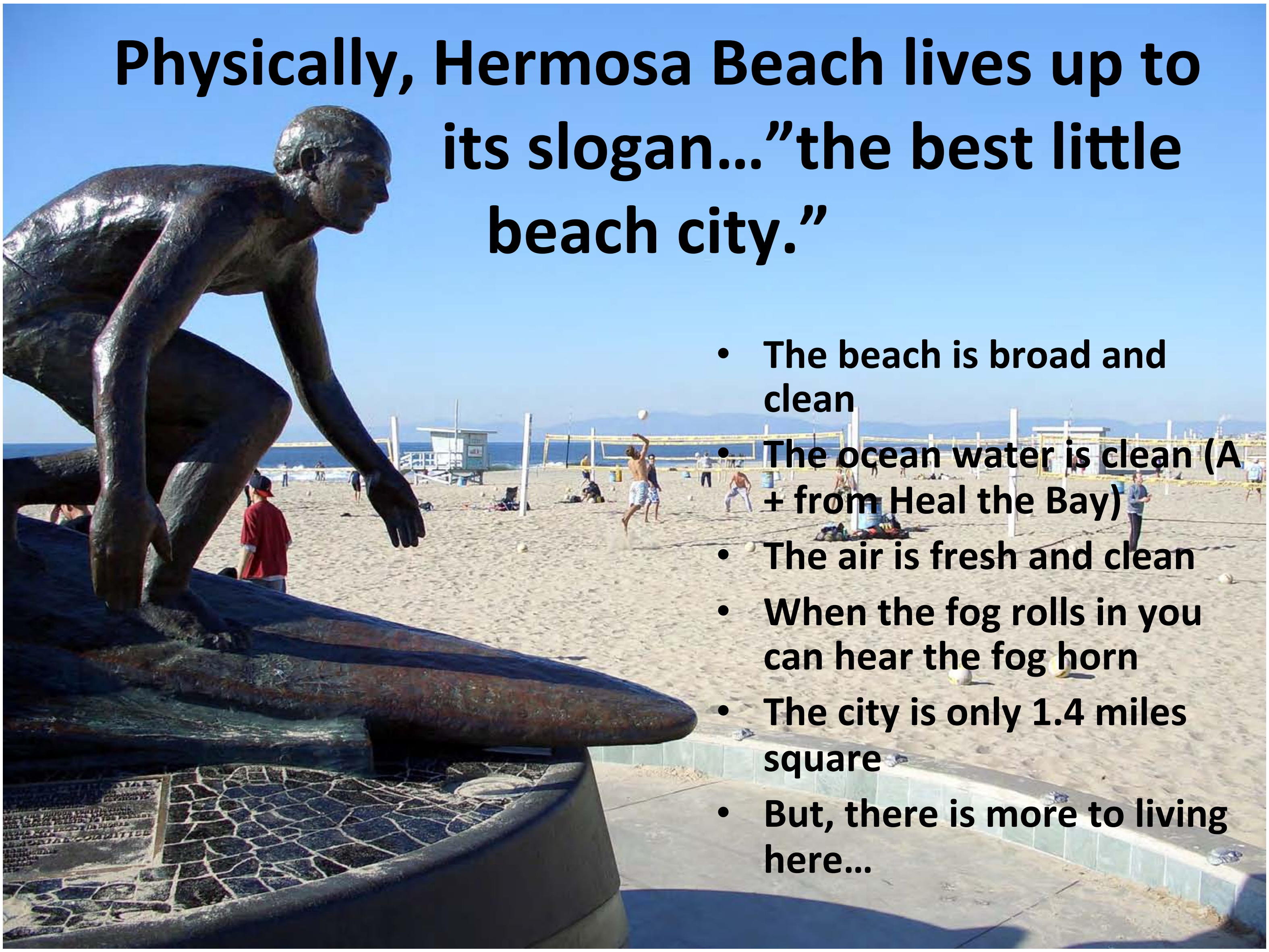
Appendix F

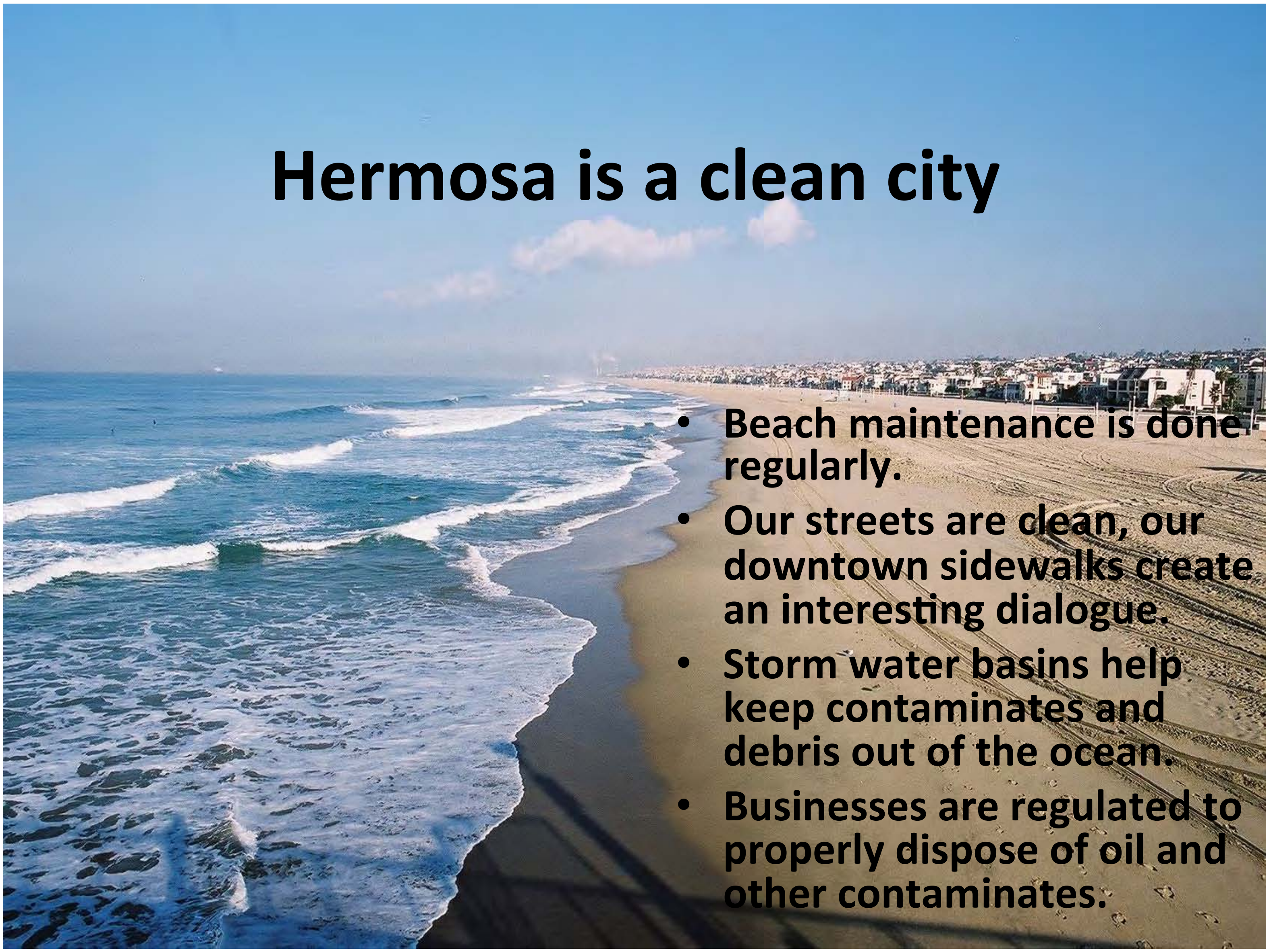
Quality of Life Committee Presentation


Quality of Life in Hermosa Beach
Community Dialogue Committee
December 3, 2013
Committee Members:
Mike Collins
Julian Katz
Julie Hamill Koch
Louisa Cushman
Andrea Valcourt
1.4 square miles of
"The Best Little Beach City"

The Committee's Challenge
Answer the following questions

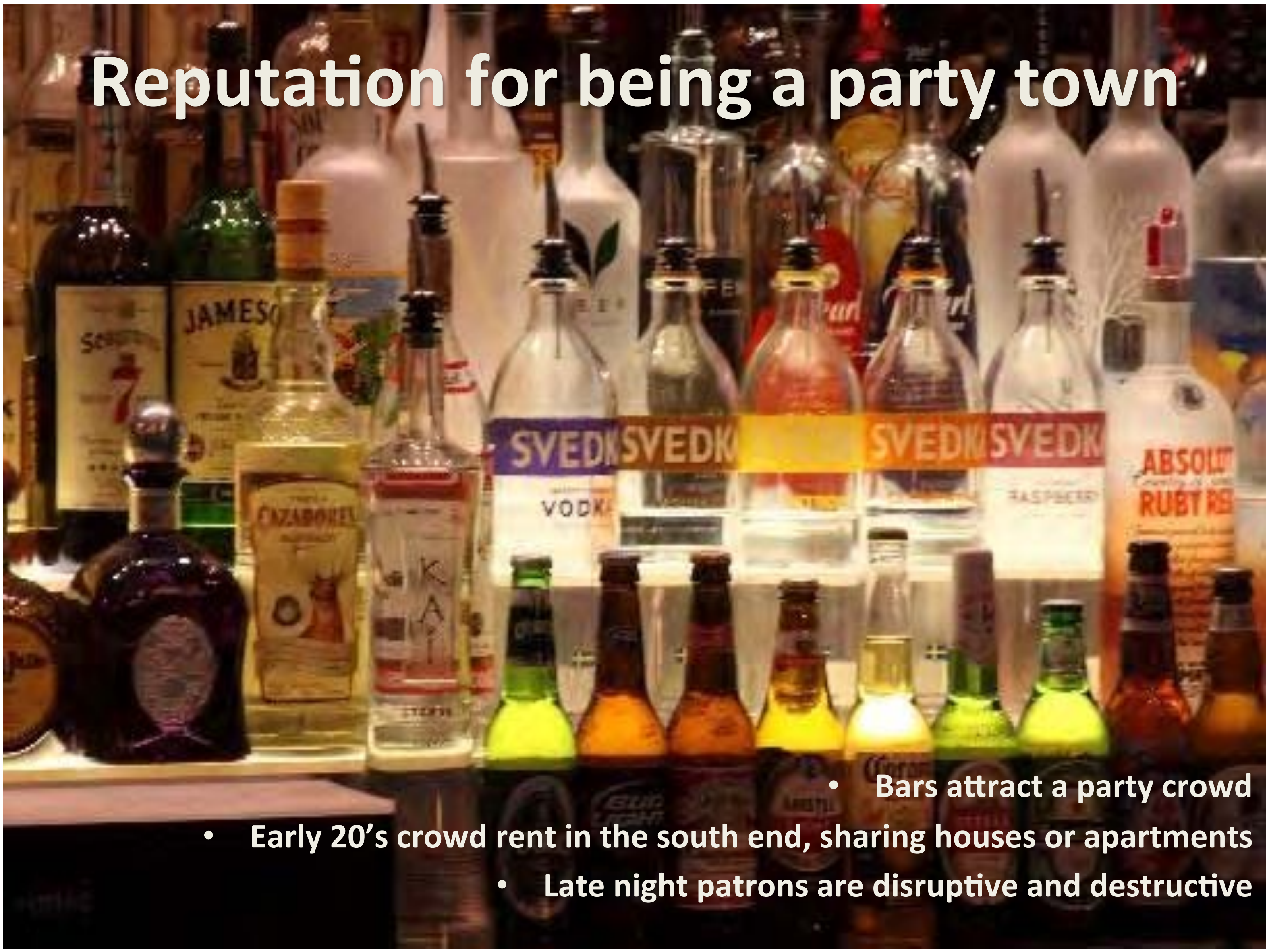
- Why did you move to Hermosa Beach and what keeps you here?
- What are the community's (the people's) strengths and weaknesses?
- What are the city's (the government's) strengths and weaknesses?
- What are the city's (the environment's) strengths and weaknesses?
- What would make you leave?
- How are these things linked together?
- What do you hope Hermosa Beach will be like in 20 years?


Physically, Hermosa Beach lives up to its slogan…"the best little beach city."
• The beach is broad and clean
• The ocean water is clean (A + from Heal the Bay)
• The air is fresh and clean
• When the fog rolls in you can hear the fog horn
• The city is only 1.4 miles square
• But, there is more to living here…


Hermosa is a clean city
• Beach maintenance is done regularly.
• Our streets are clean, our downtown sidewalks create an interesting dialogue.
• Storm water basins help keep contaminates and debris out of the ocean.
• Businesses are regulated to properly dispose of oil and other contaminates.

Reputation for being a small-town, friendly beach community

- Surfing, swimming, walking, and volleyball bring like-minded people together
- Rollerblading, biking, jogging, and walking keep folks talking
- Pier Avenue, with its sidewalk dining, promotes camaraderie
- Art shows and music festivals draw the people out of their homes
- Movies in the Park bring families together


Reputation for being a party town
• Bars attract a party crowd
• Early 20's crowd rent in the south end, sharing houses or apartments
• Late night patrons are disruptive and destructive

Hermosa is health conscious

- People walk, jog and bike for exercise, and to get from place to place
- The city joined the Beach Cities Health District's Blue Zone Project
- Hermosa was the first South Bay city to be certified as a Blue Zone city
- The city enhanced the Green Belt with workout stations.
- The city maintains several large and small parks
- Citizens shop at the Farmers Market
- Children and adults get exercise playing all sports

Accessible city government

- Council meetings are open to the public and available on TV
- City council members provide office hours
- The council provides opportunities for public input on major issues
- Teenagers asked for and received a skate park
- People wanted a community garden and that is in process
- The city has a bike plan but has not added a bikeway in four years

Hermosa is a safe city

- Police respond quickly to calls
- The crime rate is one of the lowest
- Businesses put products and produce on the sidewalks, without supervision
- People walk safely about the city

Hermosa is a green city

- A major city goal is for a carbon neutral footprint
- The city received awards for green activities
- Council provided storm drain filtration systems
- Smoking is banned citywide, including the beach, but it is not enforced
- Styrofoam food containers are banned
- Our Lady of Guadalupe church uses solar panels for its energy source

Hermosa schools are some of the best

- The schools test in the top 10 percentile
- Parents and teachers collaborate and support the students
- The community participates in major fundraisers to offset
  state shortfalls

Hermosa is a small, scenic town

- Zoning keeps building heights at 30 feet
- The town has kept historic buildings
- Mansionazation has not become a priority
- There are original clapboard beach cottages and newer “beach-type” homes
- The city continues to maintain streets and infrastructure


Hermosa has involved citizens
• People participate at council meetings and com
• Citizens join Leadership Hermosa and make a dif
• Folks volunteer at schools and philanthropic organ
• Citizens and the council collaborate on the latest technology and p
• Local business owners are working with the city to attract new bus

Hermosa wants to maintain its unique character

- Maintain or enhance current building limits
- Limit large developments and/or “big box” stores
- Recruit small, green businesses
- Work with the school district to maintain and improve schools
- The Council, police, and business are partnering to reduce late Plaza activities
- Increase children’s beach play areas by adding swings and slides
- Encourage artist development such as an art district

Hermosa wants to maintain unique character without added cost

- Continue having a balanced budget. No debt.
- Investigate whether regionalizing services would be beneficial
- Encourage volunteerism for projects, adopt-a grandparent for schools
- Enlist colleges/universities to invest in technology projects here
- Seek out movie/TV filming projects
- Continue to apply for grants
- Citizens and/or businesses donate roof tops for solar to benefit the city and schools
- Rent out city facilities to private and/or philanthropic events
- Implement a strategy to attract businesses that citizens want

Hermosa Beach 20 years from now

- The city attracts families and small businesses to its safe streets.
- Hermosa is profitable, with small businesses as its base.
- The city has maintained its small town feel and kept large structures at a minimum.
- Hermosa Beach's PCH and Aviation corridors are thriving.
- Pier Plaza is a more family-friendly place, with limited rowdy night life.
- Hermosa Beach is a model green beach city.
- Hermosa is a consultant to other cities, which want positive change.