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Reissued Draft Health Impact Assessment

E&B Oil Drilling and Production Project

Intrinsik Inc.

July 22, 2014

Initial Draft (February 2014)

McDaniel Lambert Scientists

Examined 18 health determinants in 5 categories

Characterized health impacts with numeric scoring system

Evaluated worst-case scenario for each health determinant

Difficult for reader to understand rationale behind conclusions

Limited recommendations/monitoring

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✓ Re-issued Draft (July 2014)

McDaniel Lambert Scientists

✓ McDaniel Lambert/Intrinsik Scientists & External Peer Reviewer

Examined 18 health determinants in 5 categories

✓ Examined 18 health determinants in 6 categories

Characterized health impacts with numeric scoring system

✓ Characterized health impacts using a standardized evaluation matrix and decision-making framework

Evaluated worst-case scenario for each health determinant

✓ Evaluated post-mitigation scenario including all EIR measures

Difficult for reader to understand rationale behind conclusions

✓ 100% transparent with scientific rationale provided

Limited recommendations/monitoring

✓ Comprehensive recommendations, monitoring, and evaluation

✓ Addition/change to re-issued HIA

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Who is Intrinsik?

Intrinsik is a professional services firm specializing in providing scientific expertise to clients across a wide range of industries.

We are recognized as a leader in environmental health, toxicology, risk assessment, and risk management consultation in the United States, Canada and around the world, covering a range of service areas from environmental to pharmaceuticals and biotechnology.

OUR PURPOSE Healthy People, Healthy Ecosystems

OUR VISION To be recognized internationally as a premier employee-owned health and environmental sciences firm.

OUR MISSION To strive for sustainable company and personal growth while upholding our core values – Science, Integrity, Knowledge

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Company Background

- Science-based consulting firm with 20+ year corporate history
- Private, independent company with offices across Canada (Calgary, Toronto, Guelph, Ottawa, and Halifax and the United States (Portland, Maine and Venice Beach, CA)
- We have worked extensively in North America as well as in: Germany, Spain, Italy, Uruguay, Chile, Brazil, Mexico, Egypt, Bermuda, Malaysia, Australia, Peru, China, Japan, Korea, Thailand, Indonesia, the Philippines, France, UK, Switzerland, Poland, Russia
- 75 employees including: two Occupational Medicine Physicians; 11 PhDs; seven Diplomates of the American Board of Toxicology (DABTs); and, three European Registered Toxicologists (ERTs)

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Key Areas of Expertise:

- Human Health and Ecological Risk Assessment
- Toxicology and Hazard Assessment
- Health Impact Assessment
- Integrated Risk Management
- Exposure Modeling (deterministic and probabilistic)
- Statistics and GIS Mapping
- Risk Communication, Public Liaison and Workshop Facilitation
- Expert Testimony
- Peer Review
- Occupational Health and Safety Support and Evaluation
- Pesticide Assessment
- Threatened and Endangered Species assessment

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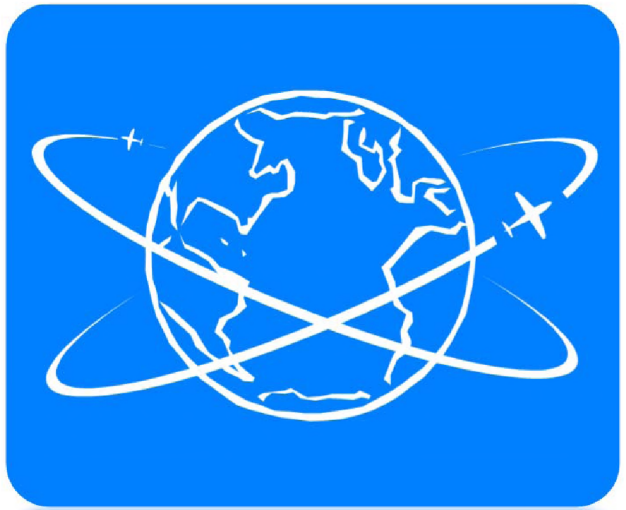
Key Client Sectors:

- Power Generation and Green Energy
- Government (Federal, State and Local)
- Transportation and Infrastructure
- Mining
- Contaminated Sites
- Oil and Gas
- Waste Management
- Tribes and First Nations
- Forestry
- Chemical Manufacturing (including pesticides and consumer products)



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Intrinsik in the Oil and Gas Sector

- Oil & gas work includes Alberta Oil Sands, refineries, oil wells, gas wells, terminals, pipeline projects and Brownfields sites.
- Work for Medical Agencies (Sarnia Medical Officer of Health, British Columbia Ministry of Health) to assess potential health impacts associated with petroleum industry.
- Work with First Nations in Canada to understand potential health impacts associated with eating wild game and traditional foods in proximity to oil and gas activities.
- Review of EIR / Contaminated Sites consulting reports for oil and gas projects on behalf of government agencies.
- Intrinsik's experts have appeared before independent environmental approval agencies, boards, tribunals and courts.

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External Peer Review

Elizabeth Hodges Snyder, MPH, PhD

- Soil and water scientist and environmental health practitioner
- Interdisciplinary background includes experience in both natural science laboratory and social science research
- Research and teaching in the fields of health impact assessment (HIA) and food security
- Assessment of Stakeholder engagement and Alaska Native Health
- Founder and member of the Steering Committee of the Society of Practitioners of Health Impact Assessment (SOPHIA)

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Health Determinants

Air Quality	Water and Soil	✓ Upset Scenario	Noise& Lighting	Traffic	Community Livability
NO_2	Surface water	Crude oil Spill	Noise	Safety	Property values
PM	Soil particles	Well blowout	Light	Perceived hazards	Access to green space
✓ TAC					✓ Aesthetics
Odor					Education funding
					Social cohesion
					Political Involvement

✓ Addition/change to re-issued HIA

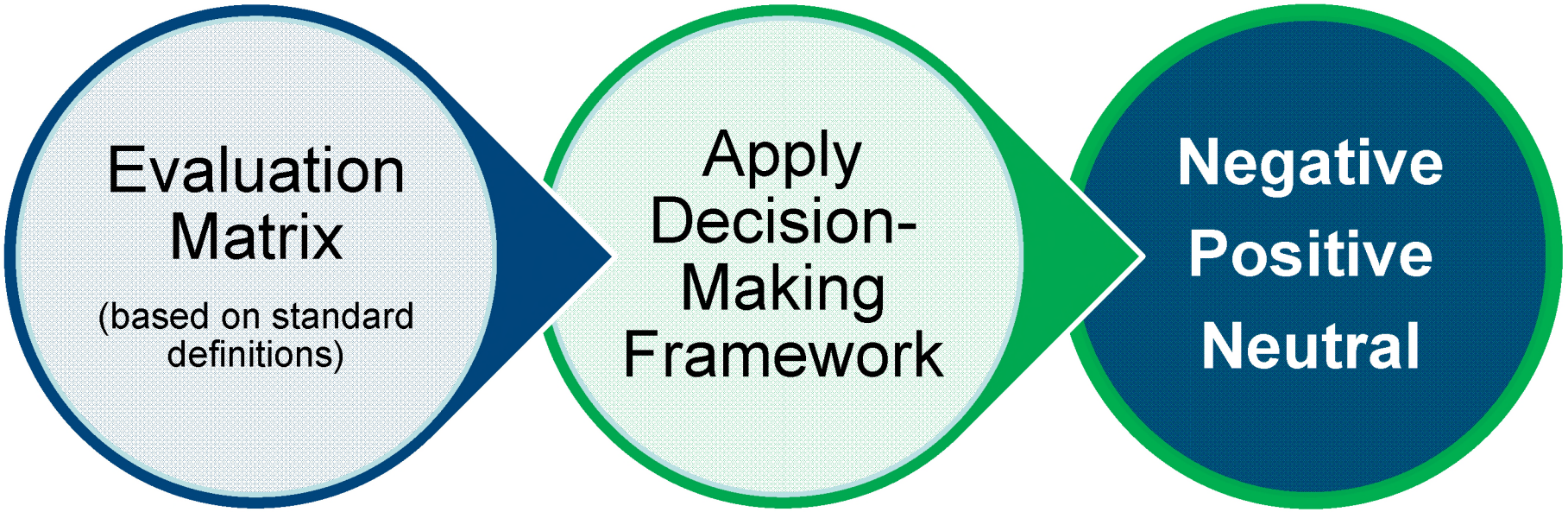
Note: two health determinants removed from re-issued HIA (greenhouse gases and lighting safety)

HIA Assessment Steps

For each health determinant:

1. Collect data on baseline conditions
2. Evaluate and weigh evidence of causal effects
3. Quantitative assessment if feasible/appropriate
4. Characterize health effects

Characterizing Health Effects



HIA Evaluation Matrix

Parameter	Definition
Geographic Extent	How far are the impacts likely to reach?
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?
Adaptability	How resilient is the community to this type of change; are they able to adapt?
Likelihood	What is the probability of the impact occurring based on the expected frequency of the exposure?
Post-Mitigation Health Effect	What is the 'direction' of the post-mitigation effect?

Evaluation Matrix Definitions

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

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Evaluation Matrix Definitions

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

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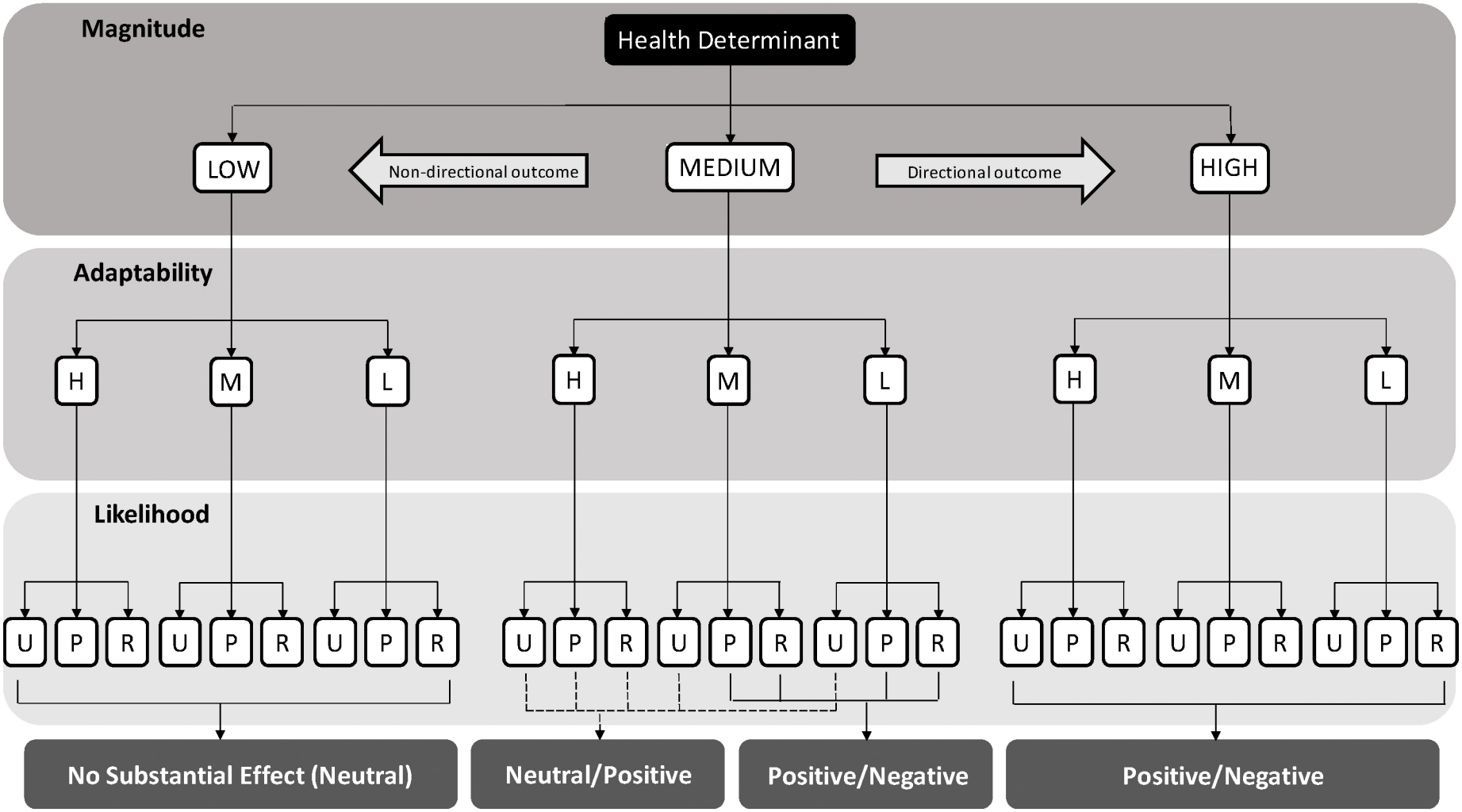
Decision-Making Framework



H = high; M = medium; L = low; U = unlikely; P = possible; R = probable

Evaluation Matrix Definitions

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.

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Example: Odor

- Unpleasant odors can contribute to a number of physical and psychological/behavioral symptoms
- EIR mitigation measures will reduce the number of odor releases, although, detectable offsite odor concentrations could still occur during small upset releases
- Magnitude of an adverse health impact from odor is **medium** because odors will be detectable, and pose a minor to moderate hazard to health

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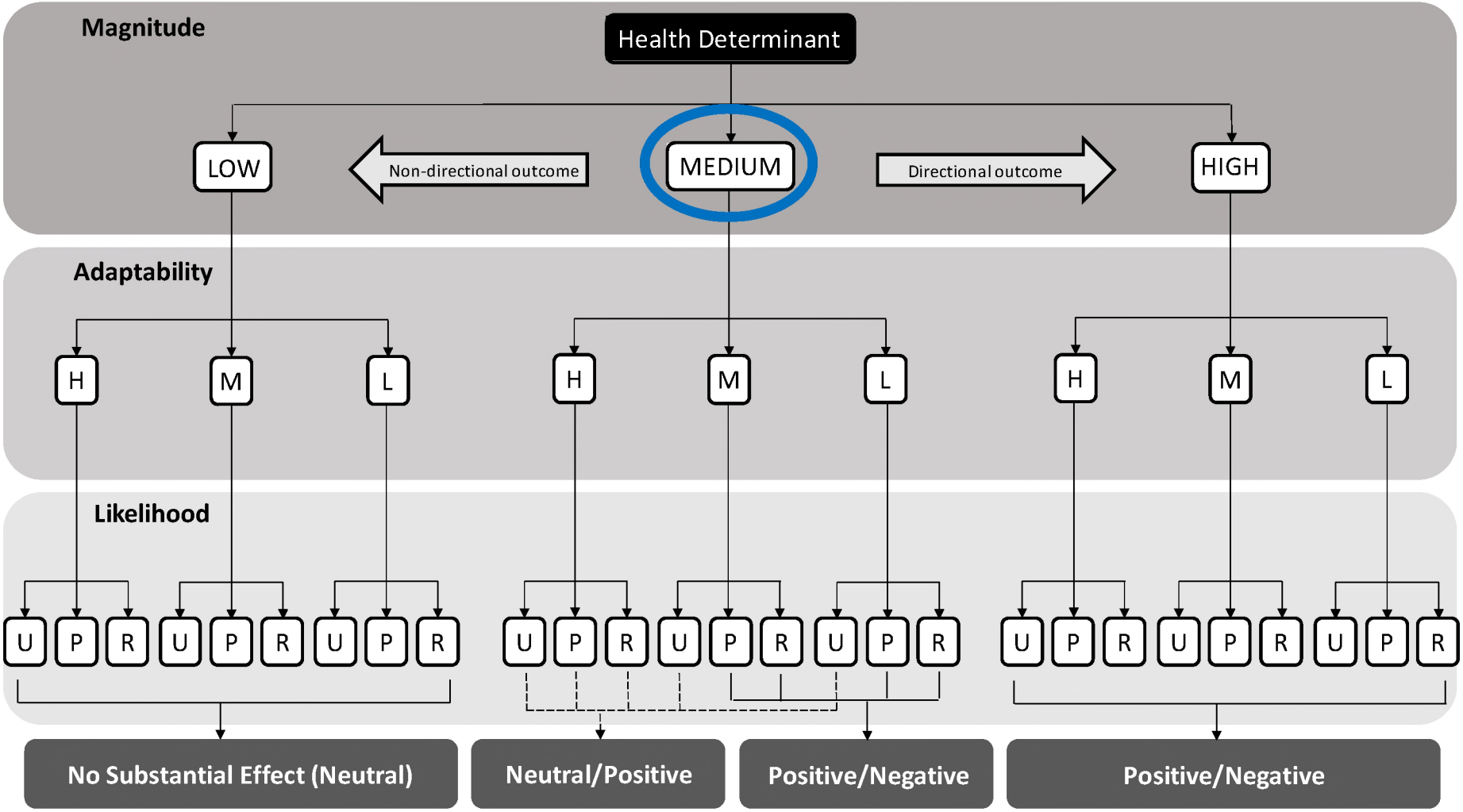
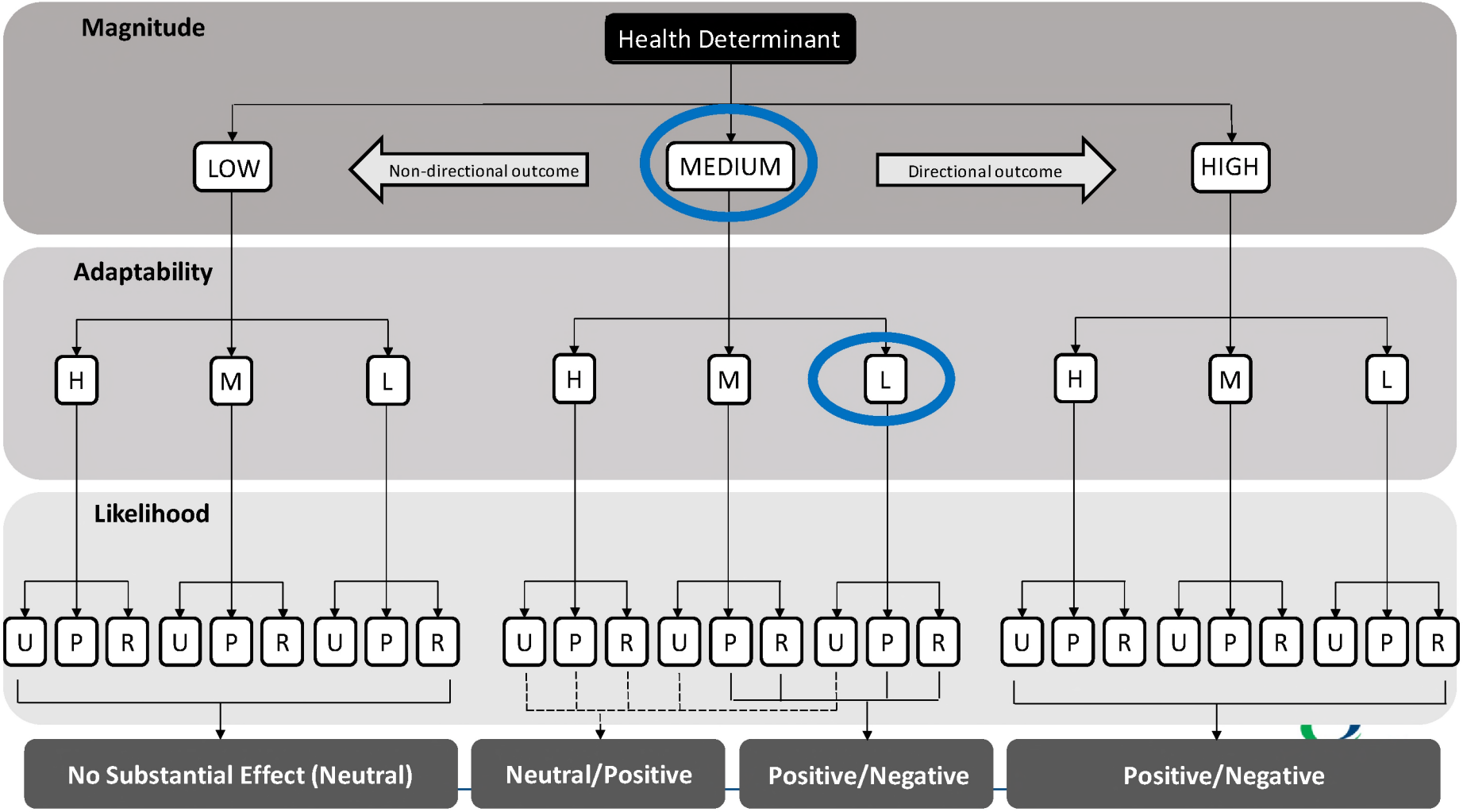
Example: Odor



Example: Odor

- Adaptability is considered to be **low** since people are not expected to adapt to odor releases

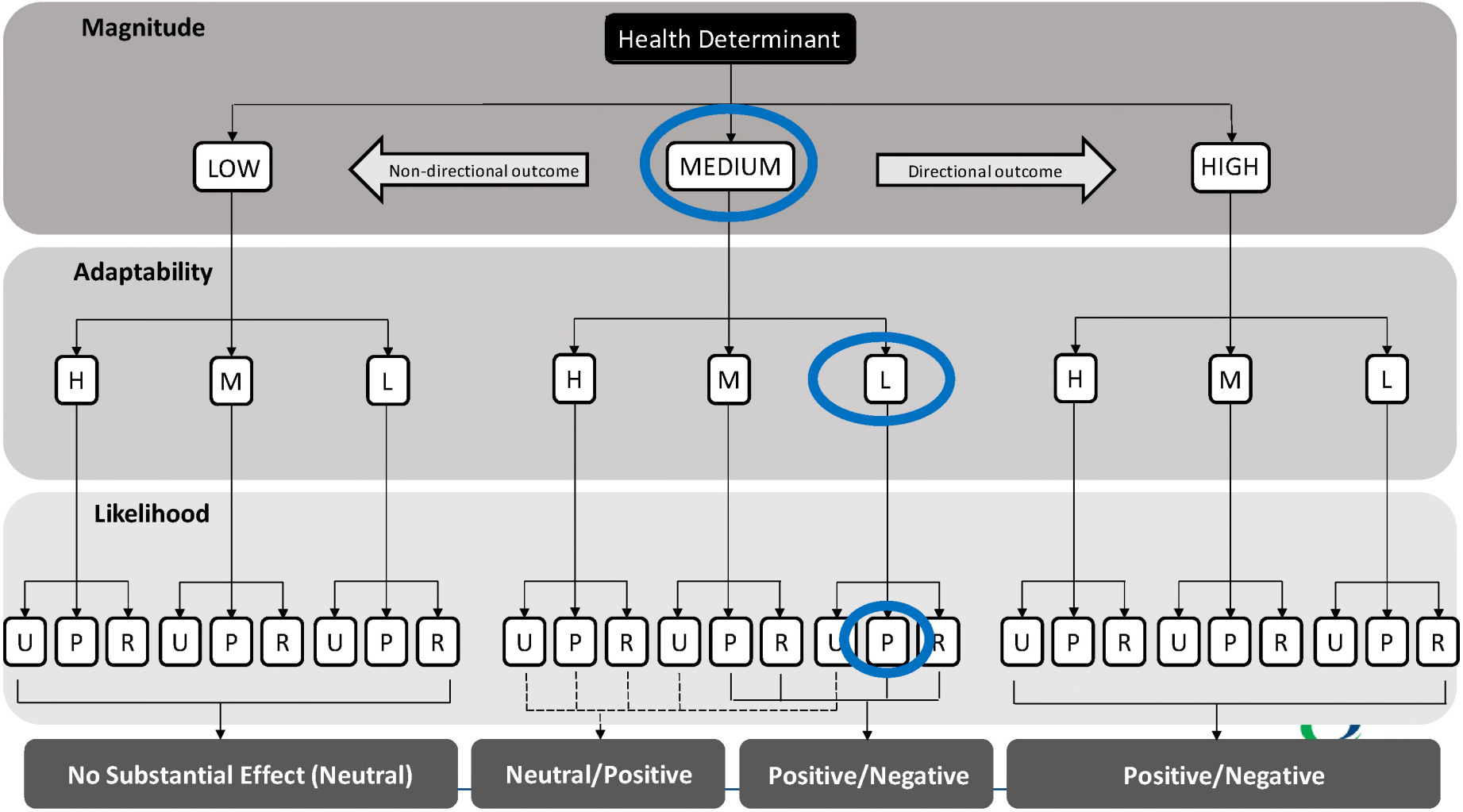
Example: Odor



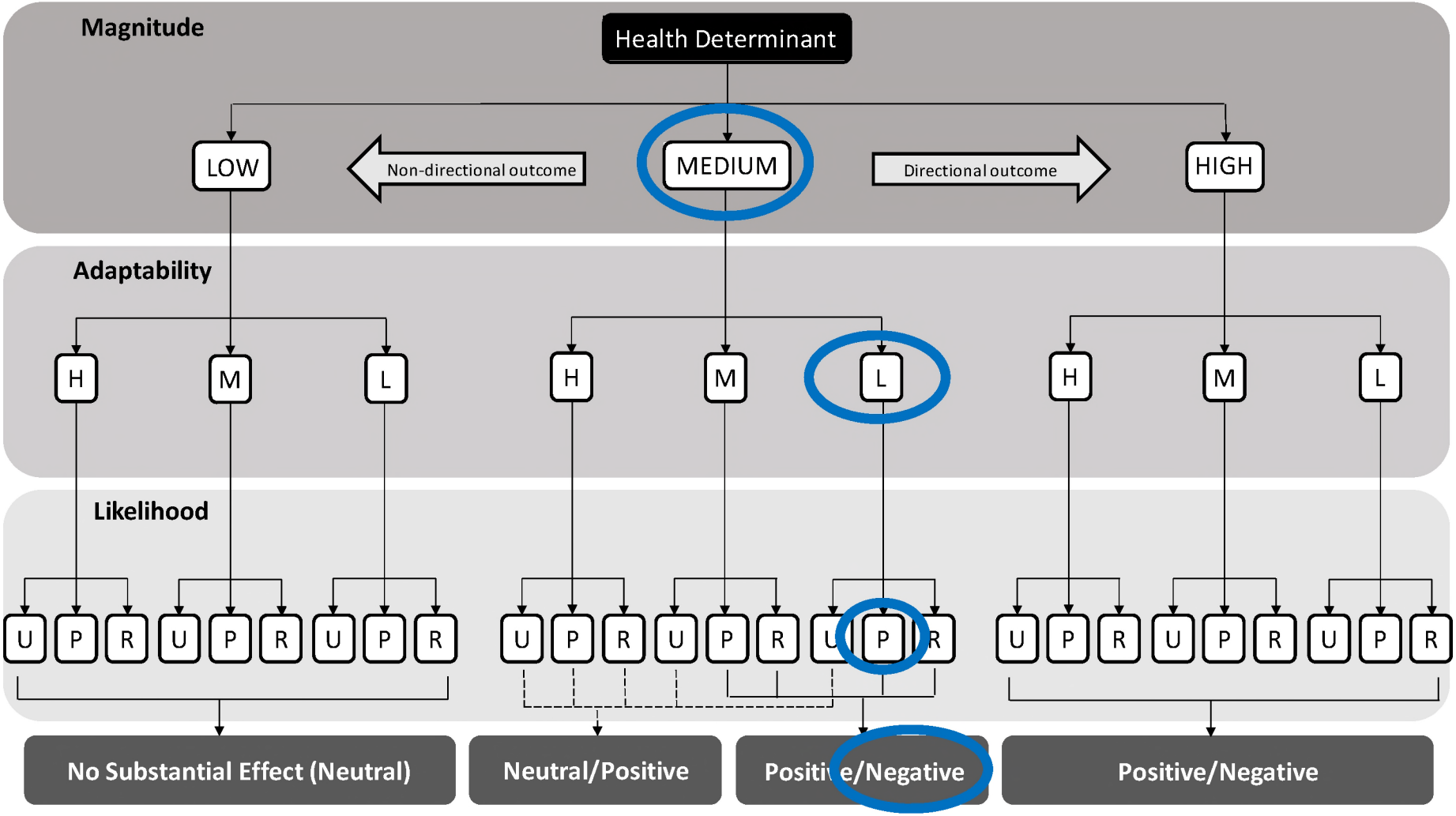
Example: Odor

- Health symptoms related to odor could occur in sensitive individuals; therefore, likelihood of health impact is considered **possible**

Example: Odor



Example: Odor



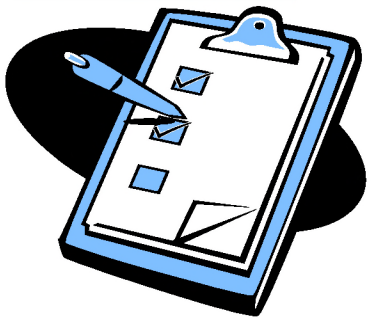
Example: Odor

- The potential odor-related health impact associated with the Project is classified as **negative**
    - 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**
- The vulnerable population identified for odor impacts are **odor sensitive individuals**

Assessment Summary

Negative	No Substantial Effect	Positive
Odor	Particulate Matter	Recreation & Green Space
Well Blowout	Toxic Air Contaminants	Education Funding
Noise Emissions (Phase 3 construction)	Nitrogen Dioxide	Political Involvement
Property Values	Surface Water	
Aesthetics & Visual Resources	Soil Particulates	
	Crude Oil Spill	
	Noise Emissions (construction & operations)	
	Light Emissions	
	Traffic Safety	
	Perceived Traffic Hazards	
	Social Cohesion	

HIA Recommendations



Odor: if frequent reports of odors occur, additional study and/or periodic monitoring may be warranted

Noise Emissions: provide local residents and schools with written notification (time and duration) of Phase 3 pipeline construction activities

Light Emissions: provide black-out blinds/curtains for residents with a direct sight line of the exposed side of 87-foot electric drill rig

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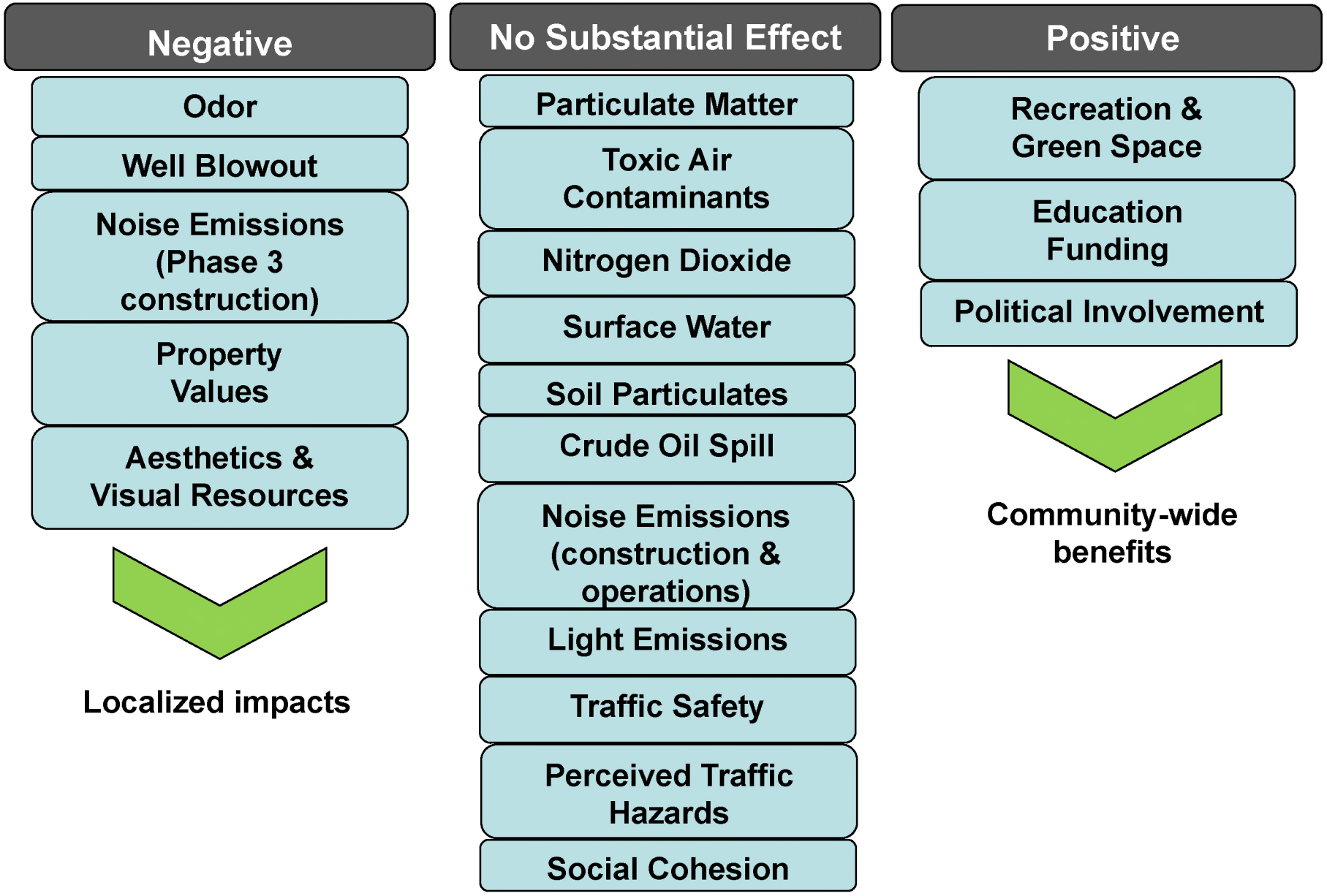
HIA Recommendations

Property Values: conduct a property value analysis to identify potential project-related changes and ensure fluctuations remain within expected local, regional and national levels

Recreation & Green Space: develop a community advisory group to assist the City on how to direct revenue for recreational activities and green space

Assessment Summary



Overall Conclusion

"Based on the proposed mitigation measures in the EIR 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."

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Monitoring

Community Liaison Committee: CLC would serve as the vehicle through which citizens could voice active concerns about Project activities; committee would work collectively to find ways of addressing concerns.

Follow-up Community Health Assessment: Analysis of health statistics by susceptible subpopulation status could identify whether so me groups are disproportionately impacted by Project operations.

Quality of Life Health Survey: Establish baseline conditions and monitor whether quality of life measures (e.g., sleep) change during the Project

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Thank you.

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