SCOPE OF WORK:

Sea Level Rise Adaptation Plan for Humboldt Bay Transportation Infrastructure – Phase 1

INTRODUCTION:

The County of Humboldt, City of Eureka, and Humboldt County Association of Governments (HCAOG) will work with Caltrans District 1 and interested stakeholders to develop a transportation infrastructure adaptation plan within one of the most vulnerable sub-watersheds of Humboldt Bay.

The project area is situated along the shoreline of Humboldt Bay at the northeast side of the City of Eureka. The project area includes highway, railroad, airport, marine, and non-motorized transportation assets, along with utility transmission lines (gas, electrical, water), wastewater pump stations, and a mix of industrial, commercial, residential, agricultural, and wildlife land use. The City of Eureka has a median household income of $39,063 which is 61% of the state-wide average of $63,783 (U.S. Census Bureau, 2012-2016 data). Transit-dependent populations rely on public transportation routes through the project area.

Affected landowners and other stakeholders will assist in establishing guiding principles, identifying priorities, and supporting the development of viable adaptation project concepts. Key information regarding landscape features, exposure, and sensitivity to sea level rise will be obtained in order to inform and prioritize project planning.

The scope of work shown below reflects the anticipated process and deliverables for the project.

RESPONSIBLE PARTIES:

The County of Humboldt (applicant) will perform this work with the assistance of two sub-applicants (City of Eureka and HCAOG), and one or more consultants. After the grant is awarded, the County will retain consultants through a competitive, performance-based selection process in accordance with the Caltrans Local Assistance Procedures Manual.

OVERALL PROJECT OBJECTIVES:

- Build relationships and an organizing framework for advancing collaborative efforts among public and private landowners at a regional scale
- Improve the collective understanding of risks to transportation infrastructure from flooding and inundation hazards associated with sea level rise in Humboldt Bay
- Identify vulnerable populations and the interests of affected landowners and stakeholders, including non-transportation infrastructure (water, natural gas, electricity) and agriculture
- Identify feasible conceptual designs that protect infrastructure and are compatible with adjacent land and develop an implementation strategy
- Develop tools for evaluating the costs and benefits of investing in adaptation projects
- Establish a methodology for developing adaptation plans that can be applied in other discrete watershed basins around the perimeter of Humboldt Bay

1. Project Initiation

Task 1.1 – Kick-off meeting with Caltrans

- The County will hold a kick-off meeting with Caltrans staff to discuss grant procedures and project expectations including invoicing and quarterly reporting.
- Responsible Party: County of Humboldt

Task 1.2 – Procurement of consultants

- The County will develop a Request for Proposals for selection of one or more consultants.
- Responsible Party: County of Humboldt

Task 1.3 – Staff coordination

- Face-to-face project team meetings with consultants to ensure good communication on upcoming tasks and to make sure the project remains on time and within budget.
- Responsible Party: County of Humboldt and City of Eureka

Task 1.4 – Identify existing conditions

- Prepare a set of base maps to identify the location of transportation and non-transportation infrastructure assets, municipal boundaries, ownership boundaries, FEMA Special Flood Hazard Area boundaries, disadvantaged community boundaries, land use categories, waterways, habitat types, and ground surface elevations.
- Develop a list of the most vulnerable properties within the project area by screening existing vulnerability assessment information.
- Develop a list of potentially interested organizations and community representatives.
- Gather previous studies and existing data relevant for assessing sea level rise vulnerability within Humboldt Bay.
- Identify relevant General Plan policies from the County of Humboldt and City of Eureka.
- Gather regulatory guidance and standards for performing vulnerability assessments and planning adaptation projects.
- Gather existing studies and data on average daily traffic, transit ridership patterns, and other metrics for use of transportation infrastructure within the study area.
- Responsible Party: County of Humboldt, City of Eureka, HCAOG, and consultant

Task	Deliverable
1.1	*Meeting agenda, presentation, minutes*
1.2	*Local Assistance Procedures Manual Chapter 10 exhibits, executed contracts*
1.3	*Meeting agendas and notes*
1.4	*Base maps; list of vulnerable property owners and potentially interested organizations and community representatives; list of relevant documents and policies; summary of transportation metrics*

2. Stakeholder Involvement

Task 2.1 – Preliminary Stakeholder Engagement

- Contact the list of property owners and potentially interested organizations and representatives developed in Task 1.4 to invite participation in the project. Develop a stakeholder master list of participating property owners, organizations, and community representatives.

- Meetings will be held at the beginning of the project with participating stakeholders, either as groups or individually based on their preference. The purpose of the preliminary engagement is to introduce the project, discuss previous studies and current information gaps, identify the stakeholder's short-term and long-term goals and priorities, identify known areas of concern, and invite ideas for adaptation measures to be further evaluated.
- Responsible Party: County of Humboldt, City of Eureka, HCAOG, and consultant

Task 2.2 – Community workshop #1

- Solicit community engagement in the project by networking with stakeholders and utilizing print/on-line/radio/social media.
- Plan and implement a community workshop to introduce the project to the public, define project parameters, inform the community of project opportunities and constraints, and solicit opinions from the community to help guide Tasks 3 and 4. Participants will be asked to complete a survey and assist in developing guiding principles for the adaptation plan.
- Compile public input from community workshop #1.
- Responsible Party: County of Humboldt, City of Eureka, HCAOG, and consultant

Task 2.3 – Intermediate Stakeholder Engagement

- Meetings (group or individual, based on stakeholder preference) will be held with the key stakeholders identified in Task 2.1 near the middle of the project term to present preliminary findings and gather feedback for continued project work.
- Responsible Party: County of Humboldt, City of Eureka, HCAOG, and consultant

Task 2.4 – Community workshop #2 and Final Stakeholder Engagement

- Community workshop #2 will present the content of the draft project report including draft design alternatives, and invite comments within a 30-day comment period. In addition, the draft report will be presented to the key stakeholders for review and comment. The draft report will be revised as appropriate based on the comments received.
- Compile public input from community workshop #2.
- Responsible Party: County of Humboldt, City of Eureka, HCAOG, and consultant

Task	Deliverable
2.1	*List of participating stakeholders; meeting agendas, presentations, minutes; summary of stakeholder interests and priorities*
2.2	*Workshop presentation; statement of guiding principles; summary of survey results; attendee list and photos*
2.3	*Meeting agendas, presentations, minutes*
2.4	*Workshop presentation; attendee list and photos; compilation of comments and responses*

3. Vulnerability Assessment

Task 3.1 – Assess geomorphic setting, drainage network, and shoreline protection

- Describe the geomorphic setting of the study area and the implications for flooding hazards. Water bodies and landforms (e.g., open bay, salt marsh, mudflat, slough channel, drainage ditch, railroad grade, levee, roadway, reclaimed tideland) will be identified and characterized.
- Identify indicators for monitoring changing conditions of shoreline structures over time.
- Develop an inspection protocol and demonstrate the protocol by inspecting a minimum of two miles of shoreline or levee.

- Describe how the drainage network functions. Assess the role of salt marsh for attenuating wave energy and buffering wave effects.
- Responsible Party: Consultant

Task 3.2 – Develop flooding and inundation maps

- Develop maps depicting areas vulnerable to temporary flooding and permanent inundation, for existing conditions and multiple sea level rise scenarios. Flooding refers to a temporary condition typically associated with extreme events, wave action, and/or impaired drainage. Inundation refers to an enduring condition associated with regular submergence of land due to tidal action.
- Mapping will utilize the best available science for Humboldt Bay.
- Responsible Party: Consultant

Task 3.3 – Evaluate potential impacts on shoreline structures and nearby infrastructure

- Identify at least six useful hazard scenarios. Scenarios will reflect a range of shoreline conditions, ground elevations, and potential flooding or inundation conditions within the study area. Scenarios will account for likelihood and frequency of occurrence and the timescale of the conditions (minutes, hours, days, months). Scenarios will identify the physical processes causing the impact (e.g., wave overwash, erosion, standing water, debris) and account for water depth and wave conditions.
- Assess the sensitivity of infrastructure assets to sea level rise impacts. Impacts could include dangerous conditions, functional disruption, minor physical effects (requiring cleanup), damage (requiring repair), or failure/loss (requiring reconstruction).
- Responsible Party: Consultant

Task 3.4 – Prepare inventory of the vulnerability of infrastructure assets

- Develop a set of maps with accompanying tables summarizing the vulnerability of infrastructure assets and adjacent land within the study area.
- Responsible Party: Consultant

Task	Deliverable
3.1	*Maps; list of monitoring indicators; inspection protocol and demonstration results; content for report*
3.2	*Flooding and inundation maps; description of methods and results*
3.3	*Description of hazard scenarios; evaluation of assessment results*
3.4	*Maps and tables; description of methods and results*

4. Adaptation Plan

Task 4.1 – Qualitative risk assessment

- Assess the potential consequences to the transportation system and affected communities resulting from sea level rise impacts within the study area. Consequences could include disruption of critical services (e.g., transportation and utility services), social consequences (e.g., impacts to public health and safety), and economic and financial consequences.
- Synthesize the information regarding sensitivity to impacts and consequences of impacts to assess the overall risk of the transportation assets within the study area. Identify the locations with the highest risks for sea level rise impacts, accounting for the likelihood and consequences of impacts. This assessment will utilize the best available information including the findings from Task 3 (but will not include quantitative probabilistic analysis).

- Responsible Party: Consultant

Task 4.2 – Develop conceptual design alternatives for adaptation projects

- Identify project concepts to address the transportation assets which are most at-risk. Consider a range of intervention options including accommodation, protection (with natural or engineered features), and retreat. Incorporate innovative physical strategies including natural infrastructure and multi-objective design objectives to the extent possible. Screen the potential options based on feasibility.
- Develop conceptual designs for at least four adaptation projects that are likely to be feasible and consistent with applicable regulatory constraints.
- Prepare budgetary costs for the four conceptual designs. Utilize a format that facilitates estimating for a range of project scales and accounting for cost escalation over time.
- Responsible Party: Consultant

Task 4.3 – Perform Benefit-Cost Analysis

- Develop a framework for performing benefit-cost analysis using best available information. The framework will account for avoided costs due to implementing successful adaptation projects. The framework will account for co-benefits (e.g., ecosystem services) from multi-benefit projects and benefits to disadvantaged communities. The framework will be structured to facilitate refinement as new or additional information is acquired in the future.
- Responsible Party: Consultant

Task 4.4 – Adaptation Strategy for Priority Projects

- Identify a range of adaptation options that could apply within the study area.
- Identify trigger points to inform the development of timelines for planning the implementation of adaptation measures.
- Develop a strategy for implementing specific adaptation projects to address the most significant risks within the study area.
- Responsible Party: County of Humboldt, City of Eureka, and consultant

Task	Deliverable
4.1	*Description of consequences and risks; maps of highest risk locations*
4.2	*Conceptual design diagrams and maps; description of methods and results; cost estimates*
4.3	*Description of analysis framework and results*
4.4	*List of range of adaptation options; list of trigger points; description of strategy for implementing priority projects*

5. Fiscal Management

Task 5.1 – Invoicing

- Submit complete invoice packages to Caltrans district staff based on milestone completion – at least quarterly, but no more frequently than monthly.
- Responsible Party: County

Task 5.2 – Quarterly Reports

- Submit quarterly reports to Caltrans district staff providing a summary of project progress and grant/local match expenditures.
- Responsible Party: County

Task	Deliverable
5.1	*Invoice packages*
5.2	*Quarterly reports*