



Humboldt Bay Municipal Water District TRF Power Resiliency Generator Project Cost Estimate Narrative

Introduction

The narrative given below includes a detailed description of every line item in the cost estimate for the Humboldt Bay Municipal Water District (HBMWD) Turbidity Reduction Facility Power Resiliency Generator Project (HBMWD TRF Generator Project), including the methodology used to estimate each cost. Aside from the pre-award costs for preparing the grant application and BCA, the costs have been separated into two Phases (1 and 2). The Phase 1 portion will consist of preliminary analyses and investigations sufficient to allow FEMA to perform NEPA prior to releasing full project funding. Phase 2 will consist of final analyses, design, and construction.

Items 2 through 16 will be completed by a private consulting firm(s) that is selected through a competitive process in accordance with Federal and State procurement requirements. The cost estimates for these items were completed by consulting engineers who have a considerable amount of experience with various types of municipal projects that include a wide range of design scopes and environmental/permitting requirements. All unit costs for these items are based on an average hourly rate of a staff level employee and senior level employee (see Attachment A, discussed further under Item 2 below).

Soft costs (non-construction costs that include costs for professional service fees, in-house HBMWD costs, etc.) vary based on the scope of services required, project size, project complexity, design constraints, etc. Engineering consultants with over 30 years of experience have reviewed the soft costs presented in the cost estimate and have confirmed that the costs are reasonable and appropriate. After these costs were compiled and reviewed, they were also compared with a separate cost estimate source for a generator project to further verify the estimated soft costs for the HBMWD TRF Generator Project. While every project is different, a common practice in estimating soft costs for planning level stages of projects is to estimate them as a percentage of the overall construction cost. As projects increase in scope, size, and complexity, soft costs and construction costs all increase accordingly. Estimating soft costs as a percentage of the overall construction cost provides a reasonable methodology for determining reasonableness of planning level costs.

Items 17 through 34 consist of all of the construction activities and will be accomplished by a private construction company selected through a competitive bidding process in accordance with Federal and State procurement requirements. The RSMeans 2021 Construction Cost Estimating Guide, which is a cost database for various types of construction throughout the country, was used as the basis for estimating many of the construction costs for this project. Because the HBMWD TRF Generator Project will take place in Humboldt County, the cost index for Eureka, CA was used for estimating construction costs. Some of the RSMeans unit costs were increased using engineering judgment based on the fact that this project will include work on an irregular surface with limited ingress, egress, and space to operate equipment. These factors will cause labor costs to increase. Additionally, the limited access will require smaller equipment to perform the work. The RSMeans cost guidelines are copyright protected; however, the line number references provided herein to allow these costs to be looked up by others who have access to the material.

Pre-Award Costs

2. Grant Application and BCA

Grant application costs include development of the project BCA and completion and submission of the subapplication itself. All work was completed on behalf of the HBMWD by GHD, a private consulting engineering firm. The unit cost presented is an average of charge out rates by staff who worked on the application. For unit cost documentation, Attachment A is a report from GHD's accounting software that shows a breakdown of the Phase 03 (Environmental Permitting) charges for a previously completed HMGP project (the Humboldt Bay Municipal Water District Blue Lake Fieldbrook Pipeline Support Retrofit Project, FEMA-1911, Cal OES PJ0009). As shown in Attachment A, the total number of hours worked for Phase 03 was 469.5, and the total effort was \$68,279.25. Dividing the latter by the former gives an average charge out rate of \$145/hour, which is the same as the \$145/hr unit cost shown for professional services throughout this cost estimate.

The cost for Item 2 represents the actual level of effort required for these activities. Attachment B is a report from GHD's accounting software that shows the total effort spent on a HMG application for the McKinleyville Community Services District Sewer Highway Crossings Retrofit Project, FEMA-4353, Cal OES PJ0059 (\$20,796.75), which substantiates the estimated \$21,025 in this cost estimate.

Phase 1 Costs

5. Preliminary Survey

A topographic survey giving elevation contours and locations will be required for the preliminary engineering design. Ground features including grade breaks and ground shots sufficient to create a digital terrain model will be established. Underground utilities, fences, and other miscellaneous topographic items will also be identified and shown on the survey.

The cost presented is based on the level of effort required for past projects that required similar topographic surveys in the Humboldt County area. Further justification of the overall soft costs for the HBMWD TRF Generator Project is given in the third paragraph of the introduction to this Cost Estimate Narrative.

6. Preliminary Engineering Design

Preliminary design of the project will be required to establish an Area of Potential Effect that will be used for the NEPA/CEQA special studies. The preliminary design will largely consist of conceptually determining the following: new footprint for the generator, fuel tank, and access road; most cost-effective locations for installing new electrical conduits; existing utility conflicts, general digital controls and communications scheme for integrating the new generator into HBMWD's SCADA system. Preliminary drawings will be developed under this task. The cost presented is based on the level of effort anticipated for this design scope by experienced consulting engineers. Further justification of the overall soft costs for the HBMWD TRF Generator Project is given in the third paragraph of the introduction to this Cost Estimate Narrative.

7. NEPA/CEQA Special Studies

This project will require biological and archeological/cultural resources studies to allow for the completion of the NEPA/CEQA processes. Phase 2 of the project will not begin until the NEPA process is complete and the project has been fully approved by FEMA/Cal OES. The cost presented for completing the special

studies for this project is based on the level of effort anticipated by experienced consulting biologists, planners, and engineers, and is based on other projects that required a similar level of effort. Further justification of the overall soft costs for the HBMWD TRF Generator Project is given in the third paragraph of the introduction to this Cost Estimate Narrative.

8. Geotechnical Investigation

The geotechnical investigation includes any necessary borings required to properly design the foundation. The scope of work for this task assumes the installation of three borings around the site to a depth of twenty feet, the logging of the borings, soil testing including moisture content, dry density, grain size analysis and plasticity index testing for soil classification, and direct shear testing for strength parameters, bearing capacity, skin friction and lateral pressure. The scope also includes a final geotechnical report detailing the field investigations and findings, recommendations for the final foundation design, a description of the seismic parameters at the site, and recommendations regarding seismic anchoring of the generator and fuel tank.

The cost presented is based on the level of effort required for past projects with similar levels of required geotechnical work in the Humboldt County area. Further justification of the overall soft costs for the HBMWD TRF Generator Project is given in the third paragraph of the introduction to this Cost Estimate Narrative.

Phase 2 Costs

11. Project Management

This line item consists of all the project management efforts for the project. The cost for this line item was estimated based on the level of effort that has been required for previous local projects funded by the Hazard Mitigation Grant Program. Further justification of the overall soft costs for the HBMWD TRF Generator Project is given in the third paragraph of the introduction to this Cost Estimate Narrative.

12. Final Survey

A preliminary topographic survey of the project area that will facilitate preliminary design will be completed as a part of Phase 1 of this project. However, after the preliminary design is completed, and after the NEPA process is completed, more data will likely be required to allow for final design of the project to be performed. This will include more detailed topographic information for the project footprint including grade breaks, ground shots sufficient to create a digital terrain model, utilities, fences, trees 12 inches and larger, and other miscellaneous topographic items. Additionally, construction staking will be required prior to construction of the project to allow construction to occur in accordance with the design plans.

The cost presented is based on the level of effort required for past projects that required similar topographic surveys in the Humboldt County area. Further justification of the overall soft costs for the HBMWD TRF Generator Project is given in the third paragraph of the introduction to this Cost Estimate Narrative.

13. Final Engineering Design

The final engineering design will include the development of 100% plans, technical specifications, contract documents, and a bid package that will be used for contractors to bid. The plans will show existing

topography, new generator and fuel tank footprints and details, new piping and electrical conduit routing, erosion control requirements, and other miscellaneous items. The final design will include the final structural analysis and design for the fuel tank, generator and generator enclosure facility to ensure compliance with current seismic code requirements. The foundation, electrical wiring and controls as well as the final design for the generator facility will be completed. The Final bid package consisting of the Plans, Specifications, Bid Sheet, and other grant requirements and contract and bidding documents will be completed and the project will be let for bid. Any questions that come up during the bid process will also be addressed, and bid addenda will be issued if required. The final bids will then be reviewed for compliance with the bid requirements, and a final bid award memo will be completed. The contract documents will then be executed with the winning bidder.

The cost presented is based on the level of effort anticipated for this design scope by experienced consulting engineers. Further justification of the overall soft costs for the HBMWD TRF Generator Project is given in the third paragraph of the Introduction to this Cost Estimate Narrative.

14. CEQA Document

This line item includes the development, submission, and filing of a California Environmental Quality Act (CEQA) document for this project, which is assumed to be a Categorical Exemption. However, it is possible that a Mitigated Negative Declaration will be required.

The cost presented for this line item is based on the level of effort anticipated by experienced consulting biologists, planners, and engineers, and is based on other projects that required a similar level of effort. Further justification of the overall soft costs for the HBMWD TRF Generator Project is given in the third paragraph of the Introduction to this Cost Estimate Narrative.

15. County & Air Board Permitting

This line item includes the development, submission, and filing of an Authority to Construct (ATC) and a Permit to Operate (PTO) applications with the North Coast Air Quality Management District. Once the final generator is selected, the District will file an ATC with the local Air Board detailing the specifications of the new generator and paying the necessary permit fees. The Air Board will then review and approve the generator specified in conformance with California emission requirements. Once the generator is installed, the District will notify the Air Board to inspect the new installation and they will file the PTO with the Air Board and pay necessary permit fees. The District will also have to update their Spill Prevention Control and Countermeasure Plan (SPCC) for the site to include the new fuel tank and generator. The updated SPCC will be filed with the Humboldt County Department of Environmental Services.

The costs presented are based on the level of effort required for the preparation of these permits and plans based on similar projects, such as the McKinleyville CSD Generator Upgrade Project (2018) and the preparation of other SPCC Plans for the District.

16. Construction Management

This line item consists of overseeing the bidding process and contract award, and all construction inspections, engineering daily inspections, submittal review, responding to contractor requests for information, processing contract change orders, invoice reviews, developing as-built drawings, and all other work required to oversee and ensure that construction of the project is properly executed. This item will also include closeout of the construction project.

The construction management cost presented for this project is based on the level of effort anticipated by experienced consulting engineers, and is based on other projects that required a similar level of effort. Further justification of the Construction Management cost for the HBMWD TRF Generator Project is given in the third paragraph of the Introduction to this Cost Estimate Narrative.

17. Mobilization and Demobilization

This line item includes all costs to mobilize/demobilize equipment to/from the project site for construction, insurance and bonding costs, pre-order construction materials, and clean up the project site post-construction.

The costs covered by this line item, particularly the bonding and insurance costs, are typically a percentage of the overall project cost ranging from 3 to 10%. The cost for this item provided in the cost estimate (\$70,000) is approximately 6% of the total estimated construction cost (\$1,137,426). This should be sufficient for the contractor's costs associated with this line item, based on previous construction contracting experience in Humboldt County.

18. Silt Fence/Fiber Rolls

This line item includes the cost to setup and maintain silt fencing and any other required sediment controls along the downslope portions of the project to ensure that no sediments are discharged into the waterway in compliance with the environmental permitting process. The contractor will also have to permit, observe, and report the sediment and erosion control procedures throughout the construction as required by Humboldt County in their grading ordinance. If more than 50 cubic yards of earth are moved in the construction, a Grading Permit will also be necessary and will be obtained from Humboldt County. The cost estimate provided assumes that a grading permit and associated fees will be required. Cost was based on 350 lineal feet of silt fence at a per linear foot cost for silt fencing provided by the RSMeans Construction Cost Estimating Guide (RSMeans) Line 312514161000 for the installation and maintenance of silt fencing, along with additional costs estimate for County permitting and reporting for a project of this size and scope.

19. Grading & Aggregate: Road, Generator & Fuel Tank

A portion of the project site will need cut and a portion of the project site will need fill. This line item includes that grading work in addition to the aggregate base that will be placed across the site for the road and the pad/foundation for the generator building and the fuel tank pad. The unit cost was determined using RSMeans cost for rough grading (Line 3312213200150), finish grading (Line 312216101050), and aggregate base (Line 321123238200); the asphalt paving unit cost is based on bids received for the Mad River Crossing Project in March of 2018.

20. Pads for Generator & Fuel Tank

This line item includes the foundation/equipment pad for the new fuel tank and the new generator facility. The cost assumes 869 SF of 3,000 psi structural concrete, slab on grade, 8-inch thick (RSMeans Line 033053405020) as well as reinforced with #4 reinforcement at 4-inch centers, each way, each face (RSMeans Line 032111502550).

21. Sound Attenuating Generator Enclosure

This line item includes the sound attenuating generator enclosure and was estimated based on the experience of a senior electrical engineer.

22. 750kW Generator

This line item includes the 750kW generator and installation. This unit cost is based on a quote from Cummins Corporation for the generator itself and the installation costs included in a recent bid for a generator project for the McKinleyville Community Services District (2018).

23. Automatic Transfer Switch

This line item includes the automatic transfer switch for the new generator and is based on the costs of the automatic transfer switch in a recent bid for a generator project for the McKinleyville Community Services District (2018).

24. Electrical Conduit to Backwash Facility

This line item includes electrical conduit from the new generator facility to the backwash building, which will power the backwash pumps in the event of a power outage. The unit cost per linear foot of conduit is based on RSMMeans rigid galvanized steel conduit, 2" diameter (Line 260539400200), wiring 3/0 (Line 260519900300), and 12" wide, 36" deep trenching and backfill (Line 312316142850) and includes the cost for pull boxes as well.

25. Electrical Conduit to Duct Heaters

This line item includes electrical conduit from the new generator facility to the duct heater in the chemical building, which will power the duct heaters in the event of a power outage. The unit cost per linear foot of conduit is based on RSMMeans rigid galvanized steel conduit, 2" diameter (Line 260539400200), wiring 3/0 (Line 260519900300), and 12" wide, 36" deep trenching and backfill (Line 312316142850).

26. Electrical Conduit to Sludge Pumps

This line item includes electrical conduit from the new generator facility to the sludge pump station building, which will power the sludge pumps in the event of a power outage. The unit cost per linear foot of conduit is based on RSMMeans rigid galvanized steel conduit, 2" diameter (Line 260539400200), wiring 3/0 (Line 260519900300), and 12" wide, 36" deep trenching and backfill (Line 312316142850).

27. Concrete Coring for Conduit

This line item includes the coring through buildings and floors necessary to bring the conduit from the new generator facility to the MCCs necessary to power the backwash pumps, duct heaters and sludge pumps. The unit cost per each coring is based on an estimate from a senior engineer with more than 20 years of experience and is based on recent coring projects for the HBMWD Collector new transformer installation costs (2019).

28. 3,000 Gallon Fuel Tank

This line item includes the 3,000 gallon fuel storage tank that will provide fuel to the generator. This will enable extended running capability of the generator and therefore extended water treatment and distribution for the HBMWD. This unit price is based on quote for a 3,000 gallon tank provided by Donlee Pump Company, with an increase based on engineering judgment to account for installation.

29. Double Wall Fuel Lines to and from Both Generators

This line item includes approximately 550 LF of double wall fuel lines to and from the adjacent new generator facility and also to and from the existing generator facility, located in the chemical building. This

unit price cost is based on RSMeans primary containment (Line 335213160050), secondary containment (Line 335213161130) and 12" wide, 36" deep trenching and backfill (Line 312316142850).

30. Fuel Transfer Pumps with Leak Detectors

This line item includes transfer pumps with leak detection to transfer fuel from the 3,000 gallon fuel storage tank to the smaller fuel tanks that directly feed each of the generators. The unit price is based on RSMeans tank leak detection systems for hydrocarbons & hazardous liquids/vapors, with control panel and monitoring system (Line 284215500180), fuel oil specialties: fuel pump (Line 231213101820) and fuel oil specialties: remote tank gauging system (Line 231113102100).

31. Electrical Controls and SCADA Integration

This line item includes the costs necessary to control the new generator and fuel pumps and to integrate the new generator and fuel tank and sensors into the existing SCADA system. This cost includes a new PLC located in the generator facility. The unit price is based on costs included in a recent bid for a generator project for the McKinleyville Community Services District (2018).

32. Fencing

This line item includes the removal and installation of a small portion of existing fence necessary for the footprint of the new generator facility. The unit price is based on RSMeans fencing Line 32312601200.

33. Startup Testing

This line item includes the startup testing for the new generator facility and testing of controls to both the new generator facility and the existing generator. The unit price is based on costs included in a recent bid for a generator project for the McKinleyville Community Services District (2018).