

BASIS OF ESTIMATE FOR SAN DIEGO AIRPORT CONNECTIVITY STUDY

1. Introduction

This basis of estimate outlines the information and methods used in establishing the Rough Order of Magnitude (ROM) cost estimate for several alternative concepts associated with the San Diego Airport Connectivity Study.

2. General Methodology

The general methodology used to develop the various cost estimates can be described as parametric modeling. Parametric modeling is a process where typical infrastructure elements are grouped into a variety of typical facilities. Typical facility costs are developed by combining construction activities that can be associated either with a typical cross-section or plan based on a conceptual scope of work that is common to a specific facility. The typical facility composite unit cost is developed by combining the costs for individual construction elements common to a given typical section or facility and creating a representative composite unit cost. The following describes the process used to develop scope, quantity and cost parameters for each cost component used in the estimate:

- **Scope** – For most estimate components, the scope was determined by an evaluation of discrete construction items or activities that are typically associated with that item. Planning and conceptual graphics and drawings have been provided on which scope and quantities were based.
- **Quantities** – Construction items and their related quantities were developed from a variety of planning and conceptual engineering graphics and drawings. Direct measurement from drawings and mathematical calculations were used to prepare quantities for significant construction items in the cost estimates. Some quantities have been estimated by the use of allowances or other indirect means for items where there was not sufficient detail to perform a direct quantity takeoff.
- **Cost** – Unit prices for each of the construction items or activities was developed utilizing an excel based cost estimating database. Historical unit prices were then applied to the unit quantities identified for each cost item to produce an overall unit price for each cost component. For some minor lump sum items or items where the scope of work could not be readily determined, an allowance cost has been used.

3. Report Format

The estimate report has been developed in a spreadsheet format that presents the construction cost items and unit quantities sorted according to individual line items based on a numbering system using FTA Standard Cost Categories as the major heading and then sequential numbering as the minor heading.

4. Unit Price Parameters

Estimating parameters that were developed for each of the cost items are described below.

4.1 - Quantities: Construction items/activities and their related quantities were generally taken from the conceptual engineering graphics. Some quantities were estimated by the use of allowances or other indirect means for items where there was not sufficient detail.

4.2 – Unit Costs: Unit costs for identified construction items/activities were developed from historical representative unit prices adjusted to reflect San Diego area city cost. These costs reflect bid level prices that would include normal contractors indirect, overhead, and profit markups. All costs are in 1st quarter 2019 dollars:

5. Escalation

The cost estimate reflects 1st quarter 2019 dollars and no allowance is included for escalation. One exception to this is the Transit Operations Cost. That has been escalated and then inflation applied per SANDAG's economic forecasts over the 30-year period and then represented in 2019 dollars.

6. Design Allowance

A design allowance is typically included in an estimate as address uncertainties based on the level of engineering design completed or imperfections in estimating methods that are associated with a project's development stage. The design allowance is estimated as a percentage by which a calculated value may differ from its final value. The design allowance is used to account for those items of work (and their corresponding costs) which may not be clear or cannot be quantified at the current level of design. The design allowance can also be used as a means of indicating areas of work that may experience higher than expected cost due to constructability issues, difficult site conditions, geotechnical uncertainties, etc.

The following is a table of design allowances that have been used in the estimates. The selection and application of these design allowances is based on professional experience and judgement.

Description	Design Allowance
Vehicles	20%
Standard Allowance	25%
Moderate Allowance	30%
Geotechnical/Undgerground Allowance	35%
Challenging Allowance	40%

Example of a Challenging Allowance would be working in an active railroad environment within the fowl zone significantly impacting work production, working in the Runway Protective Zone work windows and conditions, or working with high ground water with significant dewatering and special construction methods required.

7. Land and Right of Way Cost

Bender Roesenthal Inc. (BRI) developed preliminary budget estimates for the real property interests and associated right of way costs associated with various intermodal conceptual alternatives developed by WSP USA and San Diego Association of Governments. The concepts provide for different types of intermodal transportation alternatives in and around the San Diego Airport.

WSP USA and San Diego Association of Governments provided conceptual exhibits for the preparation of the estimates. The exhibits presented the possible alignments and right of way impacts for subsurface, surface and aerial facilities.

The exhibits were used to identify the specific parcels which may be involved. Through phone conference with our clients, BRI was able to formulate an approach to provide reasonable rough order of magnitude cost estimates for the alternatives.

To develop these estimates, BRI took a conservative approach and where the requirements created a potential legal non-conforming remainder parcel, a full acquisition was applied. To develop the estimate a small amount of sales, but predominantly listings were researched and analyzed for land and various improved property types. When easements were required, BRI selected an appropriate percentage of fee value to estimate the property rights.

Various listings were gathered for land value consideration. There was a wide range in unit values depending primarily on location. BRI developed an opinion of \$400 per square foot for residential uses, \$300 per square foot for commercial uses and \$250 per square foot for industrial uses as a land value benchmark considering there will be some above and some below this benchmark. BRI deviated from the benchmark to better reflect unique situations. Special considerations were given to unique parcels, i.e.: City fire station, Unified Port District lands, land acquired in full to construct improvements and then excess lands sold off after construction. Improved property

estimates were derived from sales or listing of similar type improvements and then developed a unit value per the size of the improvement. These unit values were applied to the indicated improvement sizes identified for the impacted parcels.

It is anticipated since local agencies are stakeholders in this project, that local agency lands or rights-of-ways will be available for this project. No state or federal lands need to be acquired. If the Central Mobility Hub on the Navy's NAVWAR parcel, it is anticipated that will be by means of a mutually agreeable negotiated deal which may be based on exchange of value; no dollar costs have been allotted in the cost estimate.

WSP provided percentage adjustments to capture additional potential right of way costs. BRI conducted spot assessment of costs above and beyond real property interests and were well in the range of WSP USA's proposals. These adjustments appropriated reflect the damage potential to partial acquisitions, relocation assistance for displaces, owner appraisals (SB1210), adverse court awards, miscellaneous ancillary interests and potential loss of business goodwill claims.

At this level of concept and plan development, utilities were not researched or mapped. A general allowance (percentage of construction cost) has been incorporated into the estimate. From general knowledge and past projects in the of the vicinity of the project, known major utilities anticipated to be impacted have been addressed as an individual line item in the element and unit cost build up.

8. Professional Services

An allowance for professional services have been included using a percentage markup of 40%. Typical service categories covered under professional services include environmental analysis, engineering, project and construction management, agency staff, testing, right-of-way acquisition, legal and surveys.

9. Contingency

The design allowance was allocated to each unit element on a line item basis. In addition, a 10% contingency has been added to all concepts.

10. General Assumptions

- This estimate costs are based on 1st Quarter 2019 dollars.
- This estimate is intended for comparative use in the analysis and evaluation of alternative concepts only and should not be considered for budgeting purposes. Further engineering and design must be completed before there is sufficient information to prepare cost estimates for budgeting.

11. General Exclusions

- Escalation; except 30 year operating cost
- Financing costs.

12. Qualification

The estimate reflects conceptual development of construction items and activities as they have been depicted in the conceptual engineering graphics and include several estimating assumptions that are based on professional experience and qualifications. There are a number of factors which could affect the applicability of the developed quantities or unit prices to an actual project and the use of this information should be subject to this understanding. It is an accepted understanding that parametric estimates, with the very minimal level of engineering conducted at this time and the complexity of scope of this project, the actual project cost may be as low as -30% and as high as + 50% from this current estimate. Cost estimates may change rather significantly until engineering is developed to the 30% to 50% plan level. From that level of plan development, a higher level of confidence in the cost estimate amount can be achieved.