

Jersey Future Hospital Project

Outline Business Case

Appendix 24 – Capital Cost estimating methodology

Document Control

| Version | Date Issued | Summary of Changes | Author |
|----------------|--------------------|---------------------------|---------------|
| V1 | 26.9.17 | Document compilation | T Nicholls |
| V2 | 24.10.17 | Template updated | T Nicholls |



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FUTURE HOSPITAL PROJECT

LOCATION FACTOR

Location Factor

Location Factor allowances are generally measured within published BCIS indices. These are derived from an analysis of contract tender prices to establish the extent of change occurring over time. The most recent of these indices was published in September 2017.

The net effect of the September change taken in isolation would be a reduction of 3% in the applied Location Factor allowance. However, such a change is unrealistic, and is more likely to be a consequence of the limited number of projects reported and their relative size.

Market conditions in the UK and Jersey may also be affected to differing degrees by the UK Referendum decision to withdraw from the EU.

In conclusion, we believe it prudent to maintain the Location factor allowance applied to CR025 at the same level as used in the pricing of all options and have reflected this in our Capital Cost models.

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Determining Geographical Location Adjustment (Location Factor)

Local market conditions can have a significant impact upon the anticipated tender prices. Factors which generally affect tender prices are local market conditions, construction outputs and the prosperity of an area. However more pressing for working in Jersey are the ease/ logistics of importing material, availability of local skilled and unskilled labour and the requirements to utilise off island labour.

We have included a percentage adjustment of 24% within all options to reflect the Location Adjustment for working in Jersey.

Basis of Evidence

To date we have investigated and analysed the following published reports, indices and market tested cost information:

- BCIS published location adjustment for Jersey (not Channel Islands) published 3Q15
- Skills Review of Jersey's Construction Sector dated September 14 published by Jersey Construction Council
- Committee of Inquiry into Building Costs dated September 02 published by the States of Jersey
- Gleeds In House R&D Department
- Priced BQ's for elemental analysis for Jersey Contracts

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Initial Outcomes/ Observations

The initial outcomes and observations of the above published reports are:

BCIS published location adjustment for Jersey (not Channel Islands) published 3Q15

- BCIS - With the publication of location factors for the 2000 revised Local Authority boundaries, separate indices for Guernsey and Jersey are available. The BCIS's current location factors for the two Islands are 1.30 and 1.12 respectively.
- The sample size was 46nr projects for the Jersey index with a range of 0.92-1.38. The 90% confidence interval provided a range of 1.10-1.15 or an average of 1.12.
- Sound professional judgement is still required as we do have concerns over the sample size and project values the BCIS would use in determining their indices. Typically the project sizes would not be large enough to attract the requirement for imported labour and/ or joint ventures with local contractors. Therefore the published location adjustments need to be adjusted to reflect the loss of productivity of a transient work force plus the increased preliminaries cost of providing on island accommodation.
- The impact of location can in some instance be accounted for through mathematical formula, but judgement in application is still required. Please refer to the location adjustment validation section later in the report.

Committee of Inquiry into Building Costs dated September 02 published by the States of Jersey

- The SoJ Committee report dated Sept 02 concluded that the cost of construction in Jersey is 35% more expensive than in South East England and 46% more expensive than the UK average.
- As the report is considerably out of date we compared the BCIS TPI indices for UK Main land and Jersey from the time of the report to present day to determine if the relation between the two areas were consistent or fluctuated depending upon local market conditions.
- The outcomes of this analysis highlighted that the indices are not consistent with each other and therefore this implies that the location adjustment for Jersey is not a constant.

Skills Review of Jersey's Construction Sector dated September 14 published by Jersey Construction Council

The 'Skills Review of Jersey's Construction Sector dated September 2014' states, inter alia, the following:

- Jersey's Construction Sector employs just over 4,700 staff (9% of the Island's workforce) and contributes 6% of Jersey's GVA. The Consulting Professionals Sector employs about 500 staff.
- Over the last 3 years nearly 500 staff have left the Construction Sector and output has dropped by around 15%.
- Results from interviews and the Jersey Business Tendency Survey suggest that business confidence is now rising. This is primarily due to the public sector planning £1.2bn in capital spend over the next decade (which includes the Future Hospitals Project) plus the anticipated £4bn that is likely to be spent on private sector construction projects during that time.

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- The Future Hospitals Project is circa 25% of the public sector planned spend and therefore relates to circa 6% of the island construction output over 10 years.
- Therefore, depending upon the site option and procurement strategy, a project the size of the Future Hospitals could have an adverse implication upon the location adjustment for Jersey in its own right.
- The final construction technological solution will also have an impact or could be used to mitigate the location factor such as off-site manufacture, pod construction etc.
- To compound this the survey of firms in the Sector revealed that skills shortages are the major area of concern for construction companies and consulting professionals, their top five issues were:
 1. Difficulty of recruiting good staff
 2. Delays in starting new projects
 3. Lack of suitable training courses
 4. Pre-qualification for States contracts (PQQ)
 5. Lack of demand
- The skills shortage might result in on-island wage inflation and or the increased requirement for off-island resource, both aspects would have a detrimental impact upon the location factor.

Below is table of typical pay rates for experienced job holders in the Construction Sector:

| Job title | Jersey | UK (Recent adverts.) | UK (ONS median earnings 2013) | Variance Jersey to Recent Adverts | Variance Jersey to ONS |
|--|--------|----------------------|-------------------------------|-----------------------------------|------------------------|
| Architect | £50k | £40k | £36k | 25% | 39% |
| Civil engineer | £50k | £29k | £37k | 72% | 35% |
| Construction manager | £50k | £35k | £42k | 43% | 19% |
| Contracts manager | £60k | £40k | | 50% | - |
| Foreman | £45k | £43k | £13k | 16% | 246% |
| Planning manager | £45k | £58k | | (22)% | - |
| Project manager | £50k | £43k | £26k | 16% | 92% |
| Quantity surveyor | £40k | £30k | £37k | 33% | 35% |
| Site engineer | £50k | £45k | | 11% | - |
| Structural engineer | £30k | | £35k | - | (14)% |
| Average (excluding highest/ lowest) | | | | 27% | 44% |
| Hourly rate | | | | | |
| Bricklayer | £16 | £10.31 | £11.78 | 55% | 36% |
| Carpenter | £16 | £11.15 | £11.52 | 43% | 39% |

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|--|-----|--------|--------|------------|------------|
| Electrician | £18 | £11.65 | | 54% | - |
| Floorer | £16 | | £10.60 | - | 51% |
| Glazier | £16 | | £9.48 | - | 69% |
| Joiner | £18 | £10.41 | | 73% | - |
| Labourer | £10 | £8.08 | | 24% | - |
| Plasterer | £15 | | £11.02 | - | 36% |
| Plumber | £15 | £11.73 | £13.12 | 28% | 14% |
| Roofer | £14 | | £10.40 | - | 34% |
| Steel erector | £18 | | £10.24 | - | 76% |
| Average (excluding highest/ lowest) | | | | 45% | 44% |

- The above rates have been based upon the ONS 2013 median earnings. The sample percentage range for construction professionals is from (22) – 72 for recent adverts and (14) - 246 for ONS. This is a sample deviation of 94 and 260 respectively.
- The above rates have been based upon the ONS 2013 median earnings. The sample percentage range for Hourly trade rates is from 24 – 74 for recent adverts and 14 - 76 for ONS. This is a sample deviation of 50 and 62 respectively.

On-Island BQ Review

- A review of a number of BQ's from recent on island projects were completed on spot rates to compare the variance with main land rates.
- Below is table of typical £/unit rates from two BQ's compared against likely main land rates for a selection of elements which would likely be encountered within the FHP scheme:

| Element | On Island BQ 1 | On Island BQ 2 | Current On-Island Project | On Island BQ Average | Main Land Comparison | Variance |
|---------------------------|------------------------|------------------------|---------------------------|------------------------|-----------------------|----------|
| Concrete – Gen 1 - Founds | £165.63/m ³ | £182.55/m ³ | | £174.09/m ³ | £88.83/m ³ | 96% |
| Reinforcement Bars 12mm | £1,100.78/t | £1,140.92/t | | £1,120.85/t | £1,026.30/t | 9% |
| 140mm Block Wall | £31.85/m ² | £44.07/m ² | | £37.96/m ² | £30.00/m ² | 26% |
| Insitu RC Slab 150-450 th | £198.69/m ³ | £216.59/m ³ | | £207.64/m ³ | £90.16/m ³ | 230% |
| Structural Steel | N/A | N/A | £2,300.00/t | £2,300.00/t | £1,350.00/t | 70% |
| Vinyl flooring | £26.75/m ² | - | | £26.75/m ² | £25.20/m ² | 6% |

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- The comparison highlights a broad range of variances from the initial review. We have concerns over the sample size of projects and the comparatively small quantities of the BQ's to that of the Future Hospitals scheme which could have a detrimental impact of the rates. We have received specific cost data for steelwork from a current on-island development.

Conclusions

From the above investigations to date the following conclusions can be drawn:

- The Location Factor of Jersey is not constant with the UK mainland and fluctuates over time.
- The location factor will be dependent upon the availability of on island skilled resource and also the capacity of work on UK mainland.
- Individual Professional and skilled labour rates vary considerably.
- Individual spot items of works vary considerably.
- Anecdotally, in informal discussions with the local market, it has been advised that the location adjustment for Jersey for a project the size of Future Hospitals is in excess of the BCIS published index.
- We have however assumed the above variances in professional, labour and material costs have already been captured by the BCIS location study.

Recommendation

- We recommend following the BCIS published location factor of 12% plus additional allowances to reflect a transient work force and management resource.
- As both these options are 100% new build and without the constraints of multiple phases it is envisaged we will be able there will be a greater opportunity to utilise off island manufacture and therefore reduce the requirement of off-island labour resource.
- As such for these options we have made provision for an uplift for a transient workforce to be 12% over and above the BCIS published percentage which produces an overall Location Factor of 24%.
- We have calculated the additional cost of off island labour loss of productivity to be circa 2.5%. This is based upon 60% of the work force being from off-island with a 10% loss of productivity due to travel arrangements. The 10% reflects ½ a day per week loss of productivity.
- Further to this we have assessed the adjustment for off island resource accommodation/ subsistence to be circa 4.5%. This is based upon 60% of the work force being from off-island with a 20% increase for accommodation/ subsistence. The 20% is reflective of £70 per day allowance for accommodation and subsistence of an assumed average day rate of £350/ day per operative.
- This produces an adjustment of 5%. However the intention would be to mitigate the impact of off island accommodation/ subsistence by the investigation of alternative accommodation options, such as a temporary workers village, and have therefore reduced the percentage to 4.5% to reflect this intent.
- We have estimated the additional cost of site management for on island accommodation/ subsistence to be 2%.

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- We have calculated the additional cost of site management accommodation and subsistence to be 2%. This is based upon prelims included within the HPCG rates at 15% and 75% of the preliminaries allowance to reflect site management personnel. As such with a 20% increase for accommodation/ subsistence this reflects a 2% uplift.
- We have assumed there will be no loss of productivity for the site management team as the practicalities would be for extended working hours to compensate any loss of hours due travel arrangements.

Validation

To validate the above assumptions we assessed the potential impact of working on Jersey against an elemental split of the departmental allowances.

The elemental split was based upon the HPCG guidance for the elemental split of the departments. This was then split between Labour, Plant and Materials on a benchmark norm of 40%/ 40% /20%.

We then applied assumed percentage adjustments for working on Jersey. These percentages varied depending upon the element and the investigations which we have concluded to date.

Adjustments were then made to reflect the intent for off island manufacture.

For example we applied a 40% uplift for labour working on Jersey. For the elements of the frame, roof and stairs we assumed these could be manufactured off island and have reduced the uplift to 20% to reflect the reduced requirement of labour on the island.

The recommended Location Factor adjustment was supported by a validation exercise.

Application of Location Factor Adjustment

The Location factor has been applied as follows within the Cost Models for all options:

- Departmental costs** – These have been based upon HPCG's with a location adjustment of 1.00.
- On-costs/ abnormals** – we have priced or adjusted these to the same location as the departmental costs.
- Fees** – Fees are based upon benchmark percentages of the works costs which is inclusive of location factor. Therefore the fees reflect the uplift.
- Non Works** – The non-works have been based upon Jersey allowances and therefore there is no uplift for these allowances.
- Equipment** – Equipment has been calculated as a percentage of the departmental costs. As equipment is manufactured globally we have assumed logistics costs would already be included therefore no uplift has been applied to this element.

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- vi) **Contingencies** – These have been calculated as percentage of the above elements. Therefore where Location Factor is applicable then contingency allowances have been included for the Location Factor.

Next Steps

The following are the next steps which we will investigate so as to gain greater surety of our current assessment and findings during the OBC development:

- Continue investigation of whether any other published reports relevant in relation to the location adjustment for Jersey.
- Continue to benchmark key components in both Jersey and mainland UK. Items should include steelwork, cladding panels, windows, concrete etc so as to determine the validity of anecdotal comments. This investigation will form the bedrock of a more detailed analysis once an elemental cost plan has been compiled.
- Investigations to be taken for the appetite of the SoJ to bulk purchase materials as a means of managing the location factor and also inflation.
- Informing indicative design to mitigate construction solutions which could attract a greater location factor.
- Investigate opportunities to reduce on-island accommodation costs, such as a purchase of hotel/ apartments.
- Inflation is calculated by the PUBSEC indices. Any disproportionate variance between Jersey and the mainland will affect the location factor. This will need to be included on the risk register

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COST METHODOLOGY

This report sets out the capital cost estimates compiled for the OBC.

The capital cost estimates are inclusive of the following elements:

- 1) Works Cost – Inclusive of Departmental costs, on-costs and Jersey Location Factor;
- 2) Professional Fees;
- 3) Non Works;
- 4) Equipment (Supply Only of Group 2 and Supply & Fix of Groups 3-4);
- 5) Project Contingencies including Optimism Bias;
- 6) Post Base Date Inflation

Please refer to specific sections for detailed commentary of method of compiling the cost

estimates. **Estimate Base Date**

The base cost estimate and the risk allowance estimate have been prepared using rates and prices current at the time the estimate is produced – referred to as the estimate base date.

The '**Estimate Base Date**' **2nd Quarter 2016**

Construction project estimates are calculated at present day prices. An estimate must therefore be capable of adjustment to account for anticipated pricing movement (which may be positive or negative) that may occur in the lead up to agreement of a Contract Sum inclusive of Post Contract inflation.

Procurement and Contract Strategy

The Procurement and Contract strategy is defined within the Detailed Procurement Strategy report which is included in Appendix 19.

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The procurement report details the following approach adapted for cost planning purposes:

- (1) The main works will be tendered as a single project with a main contractor co-ordinating any enabling, site clearance or demolition works;
- (2) The phasing and/ or sectional completions of the works are as the programmes.
- (3) The tender price/contract sum being obtained through a two stage tender process;
- (4) The use of a standard form of contract with non-significant amendments; and
- (5) Liquidated and ascertained damages being set at levels that are commercially acceptable to contractors.

Pre-construction and Construction Phase Programmes

The pre-construction and construction phase programme on which the cost plans are based upon is within Appendix 23.

Specification

Unless specifically stated the outline specifications on which the cost plans have been based upon the Department of Health Healthcare Premises Cost Guides (HPCG's) as detailed within Appendix 7 of the guide.

Schedule of Areas

The gross internal floor areas used in the preparation of the capital cost estimates are detailed in CO004.

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The architects drawn areas have been used for the gross internal floor areas. Allowances have been included by the architect to provide for engineering, circulation and communication space.

The following is a summary of method of compilation of each element of the Capital Cost Forms:

WORKS COST

Departmental costs

As an overarching intent we have adopted a standardised approach for all options and utilised the Healthcare Premises Cost Guides 2nd Edition [HPCGs] as published by the Department of Health [DoH]. In addition, allowances for site specific 'on-costs'/ abnormalities, location factor adjustments, fees, non-works, contingencies and inflation have also been included. These are detailed later in the report.

HPCGs are the only published source of health building cost models in the UK and are recommended for use at Strategic and Outline Business Case stages. They replace the now defunct Departmental Cost Allowance Guides (DCAGs).

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The HPCGs provide a cost per square metre for building and engineering services costs for different hospital departments. They are based on the Health Building Notes and associated example schedules of accommodation published by the DoH.

The HPCGs have been calculated by costing a cross-section of example schedules of accommodation in detail from real schemes which have been delivered. From this information, four HPCG rates have been produced (low, medium, high and super) and have been allocated to the remaining example schedules of accommodation.

For each department the published HPCG 'overall' rate has been utilised as the base starting point. When the Schedule of Accommodation has been determined, at a later stage in the project, suitable, individual rates for Public, Staff and Clinical Space can be used.

On the occasions where there are no published rates for a particular department we have utilised the published HPCG rates for either low, medium, high or super high departments depending upon the particular function.

The following adjustments have then been made to the published HPCG overall rates to make them relevant and specific to the Future Hospitals project generally and then specific for each site option:

Base Date Adjustment

The HPCGs are published at the Base Date of MIPS 480. As this index is now no longer published we have converted the base date to reflect the BCIS PUBSEC (Tender Price Index of Public Sector Building Non Housing).

The MIPS index of 480 related to April 2011. The equivalent PUBSEC index at the time was 173. The 173 is recognised by BCIS as being equivalent to MIPS 480. We have then adjusted to the base date i.e 2nd Quarter '16.

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Storey Height Adjustment

The HPCGs are generally based upon a two storey building. We have adjusted the base rate utilising BCIS Building Height Index to reflect the proposed stacking/ massing plans for each option.

A percentage adjustment of -2% has been applied to account for the eight storey building.

Economies of Scale

The BCIS produces an index table that allows for any potential economies of scale. The HPCG's benchmarked projects are in excess of the upper bounds adjustment of the index. We therefore have not made any further adjustments to the rates as all site options being reviewed are in excess, in terms of area and value, of the HPCG benchmark scheme.

BREEAM

The HPCGs are based upon achieving a BREEAM Excellent rating. This is using the 2008 guidance. The Future Hospitals project has been pre-registered with the 2011 guidance. We have included a percentage increase of 2.5% of the HPCG rates to reflect the increase in requirements. This has been based upon adjusting the guidance, published within BRE report titled 'Delivering Sustainable Buildings – Savings and Payback' published 2014 for Community Health Buildings, to reflect the extra over allowances not already included within the HPCG rate and or on costs/ abnormals.

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Should the 2014 guidance be adopted then a further adjustment would be required. Currently there is no published data from the BRE in relation to uplifts from 2011 to 2014 guidance.

Please refer to the detail cost models for details of the compilation of this percentage

adjustment. **Site Specific Costs**

Site specific costs relate to all further additional allowances required in the development of a healthcare facility which are not included within the HPCGs outline specification and therefore rates. These have been compiled depending upon the option specific requirements. These relate to items such as building abnormals, externals works and site specific constraints and conditions.

Please refer to the capital cost information for the schedule of allowances included for each option of the site specific costs.

We have compiled the allowances by utilising the following approach:

- Estimates/ quotes received in relation the specific site options. We have then adjusted the quotes to omit the location factor adjustment which is included later within the cost models;
- Assessed allowances for site specific abnormals. These have been priced at the base date and based upon mainland rates. Therefore the application of the location adjustment is applicable to these allowances;
- Previous SOC addendum allowances. We have adjusted these to the base date and then omitted the location factor adjustment which is included later within the cost models

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Professional Fees

Professional Fees cover fees for both internal and external professional services that will have to be engaged to complete the project. These include the likes of ICA team, environmental impact assessors, In house Project sponsorship, and Project Director allowances.

A total of 15% has been applied for Professional Fees which has been built up from a bottom up approach to the required Professional Fees and tested by benchmarking this percentage against other facilities.

Please note Building Control and planning fees are included within the Non Works section.

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Non-works Cost

Non-Works Costs are costs that facilitate the development and commissioning of the site and building. The Non-Works Costs have been included in accordance with Section 7 of the HPCG definitions and methodology. Examples of non works include:

- Planning fees,
- Statutory charges;
- Decanting Costs, commissioning costs etc.

Costs for IT equipment, where excluded from engineering services costs as Para 5.10 of the HPCGs, have been included separately to commissioning costs.

The estimates and allowances made have been based upon option specific requirements.

We have included within this category an allowance 0.5% art contribution.

Equipment

Included within the cost forms is an equipment allowance. This sum was established by applying 15% to the works costs at CR025, the figure has subsequently been fixed as a lump sum budget.

The equipment cost allowance is to cover the supply of group 2 equipment and with all costs associated with the supply and installation of group 3 & 4 equipment.

Cost allowances for group 1 and the installation only of group 2 equipment are made within the HPCG Departmental costs as these will be installed by the respective contractor.

HPCGs have analysed past schemes and indicates prior to OBC an approximate percentage of 15% should be included.

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Planning Contingency

The Planning Contingency aims to cover the most likely risks associated with the project, such as cost overruns, claims for disruption, programme elongation etc.

5% has been applied to the works costs for design development and a further 7% applied as client contingency to account for post contract change.

Optimism Bias

A percentage adjustment of 12% has been applied to reflect Optimism Bias

Please refer to the Optimism Bias Methodology presented at Appendix 29.

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Post Base Date Inflation

An inflation adjustment has been included to take account of the anticipated increase from the base date of the HPCG's to start on site. Post Contract allowances have then been derived to reflect the phasing, programme and cashflow for each specific option.

The inflation indices which we have been utilised are the BCIS PUBSEC Tender Price Index of Public Sector Buildings, Non Housing which are published quarterly data and provide guidance on the anticipated tender inflation for given periods of time. The BCIS Tender Price Indices has been applied when the programme requirements exceed the forecast indices.

Application of Goods Sales Tax

The Capital Costs reported exclude Goods Sales Tax which is charged on Jersey. This is on the understanding that all State capital projects are reported in this manner excluding Goods Sales Tax.