

SITE PRODUCTION & PROJECT MANAGEMENT

M5X01875

ASSIGNMENT 2: OPTION 2

P152115

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Introduction

This assignment will focus on Option 2 for Project Construction Management and is intended to satisfy questions 1 – 4 in the Brief provided. All projections and calculations will be based upon the size estimations obtained from the drawings presented (Fig 1.0 – 1.1).

Approximate Building Size

Using the building design at 1:100 and floor plan at 1:50 provided within the assignment brief (FIG 1.0 & FIG 1.1). A ballpark figure of building size can be estimated approximately as:

External Dimensions (Per Unit):

Length: 8.4m (16.8M)

Width: 6.2m

Floor Space 52.08 M2 (104.16M2)

Height:

2.4m (Ground Room Height)

300mm (Joist & Covering to FFL)

2.4m (1st Floor Room Height)

Total: 5.1m

Building Process & Cost

Task Number	Activity	Duration	Budget (£) per unit	Total Build Budget (£)
1	Design & Planning 15%	4w	1204561%	24091.22
2	Site Preperation	2w	2577.6	
3	Excavation	2w	3059.37	
4	Foundation	1w	2748.27	
		=	4192.62	8385.24
5	Framework, Joists & Trusses	6w	11249.28	22498.56
6	Brickwork Skin	3w	19157.52	19157.52
7	Roof Finishing	1w	6400 PU	12800
8	Windows & External Doors	1w	7179.92 PU	14359.84
9	Guttering & Downpipes	1d	675 PU	1350
10	Stairs	2d	1202.7	2405.4
11	Electrical Wiring	2w	6129.44 PU	12258.88
12	Plumbing (1st Fix)	2w	3973.2	7946.4
13	Insulation & Dry Lining	2w	11520	23040
14	HVAC	2w	6202	12404
15	Kitchen	1w	4304.6	8609.2
16	Bathroom	8d	3756.55	7513.1
17	Painting Int & Ext	2w	1726	3452
18	Landscaping	1w	2214	4428
		TOTAL	92349.68	184699.36

Design & Planning

The Design process duration and cost is highly dependent on the type of procurement route chosen by the client. If the build is based on a traditional type then the client is responsible for the design and planning at their own cost. Alternatively, if the project is to be obtained through a design and build procurement, the contractor is responsible for the initial design included within a lump sum cost for the entire project. FeesBeureau (2018) states that an architect's fees to design a domestic build such as this one can range between 5 – 15% of the overall project budget. This percentage includes Outline Design, Detailed design for tender and construction phase.

£24091.22 Planning Costs at 15% of build cost

Site Preparation

Popescu et al (2003) state that site preparation involves providing access, tree clearance and top soil clearing. For the focus of this stage of development the assumed site will take 2 weeks with 3 labourers working the site. Assuming the Machine Plant is provided by the contractor and does not incur extra costs through the requirement of hire fees. Payscale (2018) aver that the average construction labourer earns £10.74 per hour for a working week of 40hrs this equates to:

£429.60 (Average Labourer Wage)

£1288.80 (Labour per week)

£2577.60 total (2 weeks work)

Foundations

Excavation – 1 week

The overall footings measure a total of 65.4m (Fig 1.2) in length when taking into account both internal and external walls within both dwellings. The party wall is included in this calculation once as it is shared by both properties.

Snell (2018) proffers that Excavation costs can be calculated using the following values:

65.4m (total length of footings for both properties)

1000 x 600mm (Trench excavation Size)

39m³ (calculated in situ) @ £27.90m³ = £1088.10

49m³ (Total once excavated) – Loaded @ £15.23m³ = 746.27

5 Loads (16 Yard Lorry) – Disposal including tipping charges @ £25.00m³ = £1225

£3059.37 (Total Excavation & Disposal)

Construct Foundation (Trench Fill) 1 week

15m³ - Total Concrete required for foundation 65.4 x 0.9 x 0.25

15m³ @ £133.95 = £2009.25

Reinforced Mech: 65.4m @ £11.30 = £739.02

£2748.27 (Construct)

Timber Framework and Trusses

Timber Frames (2009) aver that they can produce a modular frame offsite and install it once the correct foundations are installed.

“Timber Frame Kit £80.00/M2 (£7.43/ft2) Inc. 140mm External Walls (Open panel)
90mm Internal Walls Softwood Joists & 22mm Weyroc Protect Flooring Roof
Structure Fascia and Soffits Brickwork Lintels / Ties & First Fix Ancillaries.

Timber Frame Erection £28.00/M2 (£2.60/ft2) Inc. Craneage Fixings Accommodation where required.”

Moreover, suggesting that a 150m² building will take 4 weeks to construct, this will estimate to 37.5m² per week. $208.32 / 37.5 = 5.55$ (6 weeks)

104.16m per unit x £108 supply & fit frame = £11249.28

£11249.28 x 2 = **£22498.56**

Roof Finishing

James (2017) states that an average semi-detached roof covering / replacement will take 2 men approximately 10 days to complete for a new build.

£6400 Total per unit

Brickwork Outer Skin

4 Walls with dimensions:

$$16.8\text{m} \times 5.1\text{m} = 85.68\text{m}^2$$

$$16.8\text{m} \times 5.1\text{m} = 85.68\text{m}^2$$

$$6.2\text{m} \times 5.1\text{m} = 31.62\text{m}^2$$

$$6.2\text{m} \times 5.1\text{m} = 31.62\text{m}^2$$

Total Brickwork = **234.6m²**

Davies (2018) states that 60 standard 215 x 102.5 x 65mm including a 10mm mortar bed will make up 1m² of brickwork.

$$234.6\text{m}^2 \times 60 = \mathbf{14076 \text{ bricks}}$$

BuildBase (2018) state that the brick cost is £1.02 each including VAT.

£14357.52 Materials

Docherty (2017) suggests that the rics cost index (2017) states that brickwork labour should be calculated to include 2 bricklayers and 1 labour or 2:1 index. The labour rate for this gang is estimated at £50ph or £400 for an 8hr working day.

Labourer: £10.74ph

Bricklayer 1: £19.63ph

Bricklayer 2: £19.63ph

Furthermore, suggesting that an average bricklayer will lay 600 bricks per day.

In this project, 2 bricklayers will lay 1200 bricks or 20m² per day.

$$234.6\text{m}^2 / 20\text{m}^2 = 12 \text{ days Labour (3 working weeks)}$$

$$12 \text{ Days} \times £400 = £4800$$

Total = £19157.52

Windows & Doors

Windows and Doors will take 1 week to complete.

Labour Rates per day:

FENSA Registered Fitter £150.00 (750.00 for 40hrs / 5 days)

Labourer £85.92 (429.60 for 40hrs / 5 days)

£1304.92 Total Labour for 1 week's work (40hrs).

Average new build materials cost £6000

Total: £7179.92

Guttering & Downpipes

Williams (2018) states that guttering and downpipes will take 1 carpenter: 2 days. Additionally, summarising that materials will add to £325.00 (New Build Average).

Labour @ £175.00 per day

Total: **£675.00**

Electrical wiring

Homebuilder (2018) states that a new build electrical installation will require 2 electricians at £174 per day each (£348) for approximately 12.5 days. This equates to a labouring total of £4350.

Furthermore, stating that Wiring and Fixtures will attribute an additional £1779.44 to the overall cost of the project.

Total **£6129.44**

This calculation includes all further fittings and switches required to finish the property to a standard fitout. This will not include any optional extras the client could request such as ports for multi-media systems.

Stairs

Carter (2017) Insists that a standard straight flight staircase (2.4m ceiling height) can be fitted by a carpenter and a labourer within 3 days.

Using the carpentry and labour rates obtained at previous stages, the overall labour cost will be:

Carpenter £175 per day

Labourer £85.90 per day

$£260.90 \times 3 \text{ days} = £782.70$

Straight Flight Staircase (Softwood) = £420 inc VAT

£1202.70

Plumbing (1st Fix)

Snell (2018) States that 1st fix plumbing services in a new build property should take:

2 Plumbers 8 days to complete (2 working weeks) at £176.00 per plumber per day. Additionally, avering that a basic fitout for a semi-detached property is approximately £1157.20.

Total: **£3973.20 per unit**

Plumbing (2nd Fix)

Snell (2018) proffers that 2nd fix or sanitary ware will take 1 plumber 7 working days to complete with material costs of £2524.55.

$£1232.00 + £2524.55$

Total: **£3756.55 per unit**

Insulation & Dry Lining

The internal wall dimensions on each floor are approximately 96m² per floor including the ceiling area.

Barnett (2013) estimates that this process will require Insulation, Boards, labour and skimming and will average at £120m² inclusive. Furthermore, stating that a standard house upto 120m² will take 3 weeks to complete.

$96\text{m}^2 \times £120\text{pm}^2 = £11520 \text{ per unit}$

HVAC

Holmes (2017) State that a standard heating system will require 2 men (Plumber & Labourer) working for 10 days to install a new central heating system to a standard size property. Also, avering that material costs including boiler and radiators will cost approximately £4000.

Daily Labour cost £260.20 $(176+85.20) \times 10 = 2602.00$

Total: **£6202.00 per unit.**

Lighting & Fixtures

Pre-costed: See Electrical Wiring Installation

Kitchen

Petterson (2018) that a good standard kitchen will cost approximately £3000 including some integrated appliances. Furthermore, stating that a small kitchen should take no more than 1 week using 2 staff (Carpenter and Labourer) to install.

Kitchen cost: £3000

Carpenter: £875 (5 days)

Labourer: £429.60

Total: **£4304.60**

Painting

Payscale (2018) states that £10.95 is the average wage for a painter and decorator in the uk.

2 weeks Labour: $£438.00 \times 2 = £876.00$

Materials: £850

Total: **£1726.00**

Landscaping

Labourer: £10.74ph 85.92

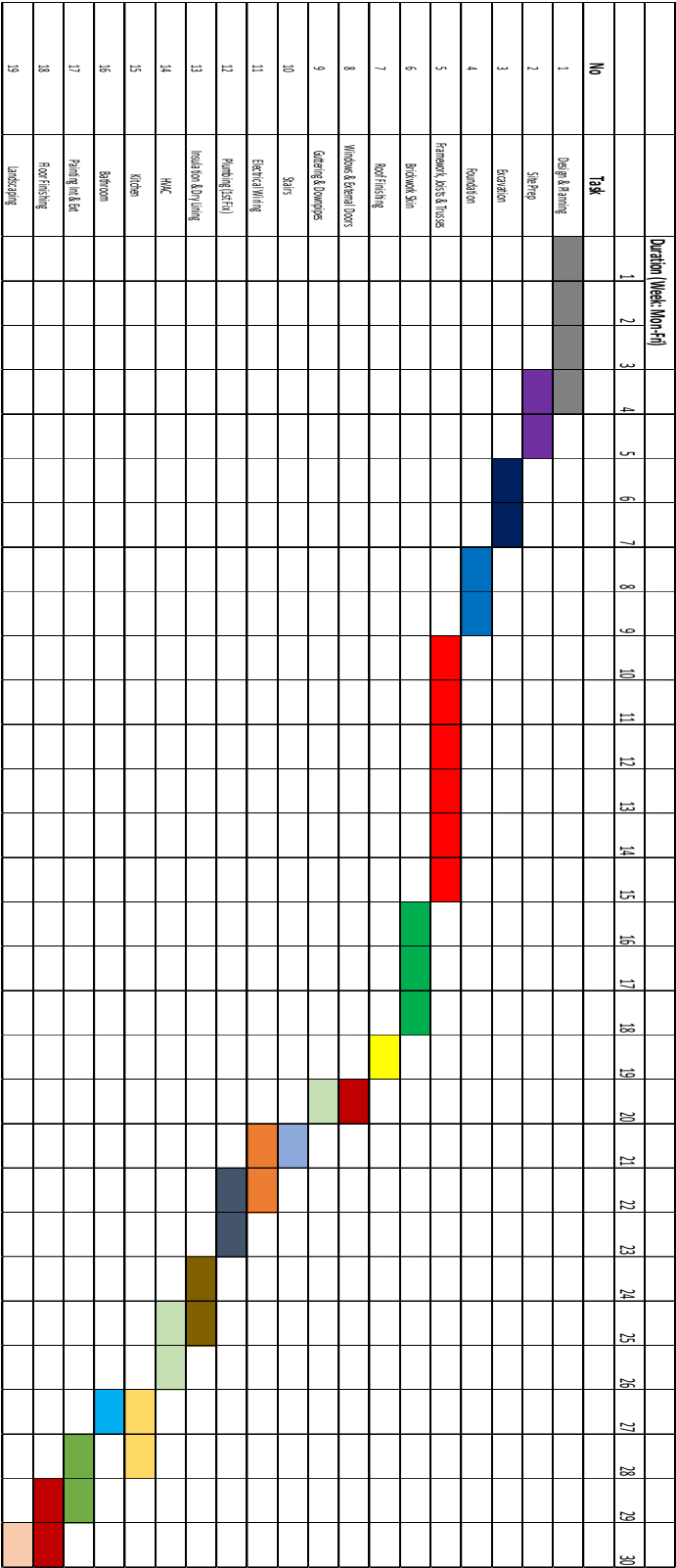
Bricklayer 1: £19.63ph 157.04

1214.80 per week Labour

Materials £1000 average for small garden with patio.

Total: **£2214.80**

Schedule :Gant Chart



Evaluation / Discussion

To Evaluate the cost and schedule of the two properties, it was assumed that all conditions during the proposed build were ideal to excellent. Therefore, unscheduled delays are not measured.

Such considerations included:

- Site location, access, soil mechanics, green site etc
- All materials were readily available by local suppliers and able to be delivered when requested.
- Adequate skilled labour and availability of labour in the local area were abundant.
- Weather during the 30 week schedule would be perfect sunshine with no delay due to rain, snow or high winds.

The costings for each section of the project were obtained through various online and offline resources. While some are directly from Spons and RICS Schedule of rates, others are obtained through research of previous projects that are documented online.

The final cost for the build was calculated to £160608.14 with an additional 15% added to the cost for design and planning. This brought the total to £184699.36.

This final costing does not take into account the cost of the site or plots.

References

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- Rics Schedule of Rates
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- SPONS 2018
- TimberDesigns. (2009). *TIMBER FRAME HOUSES - PRICE GUIDE 2009*. Available: <http://www.tailormade-frames.co.uk/Timber-Frame-Houses-Price-Guide.pdf>. Last accessed 20/02/2018.

Appendix

FIG 1.0

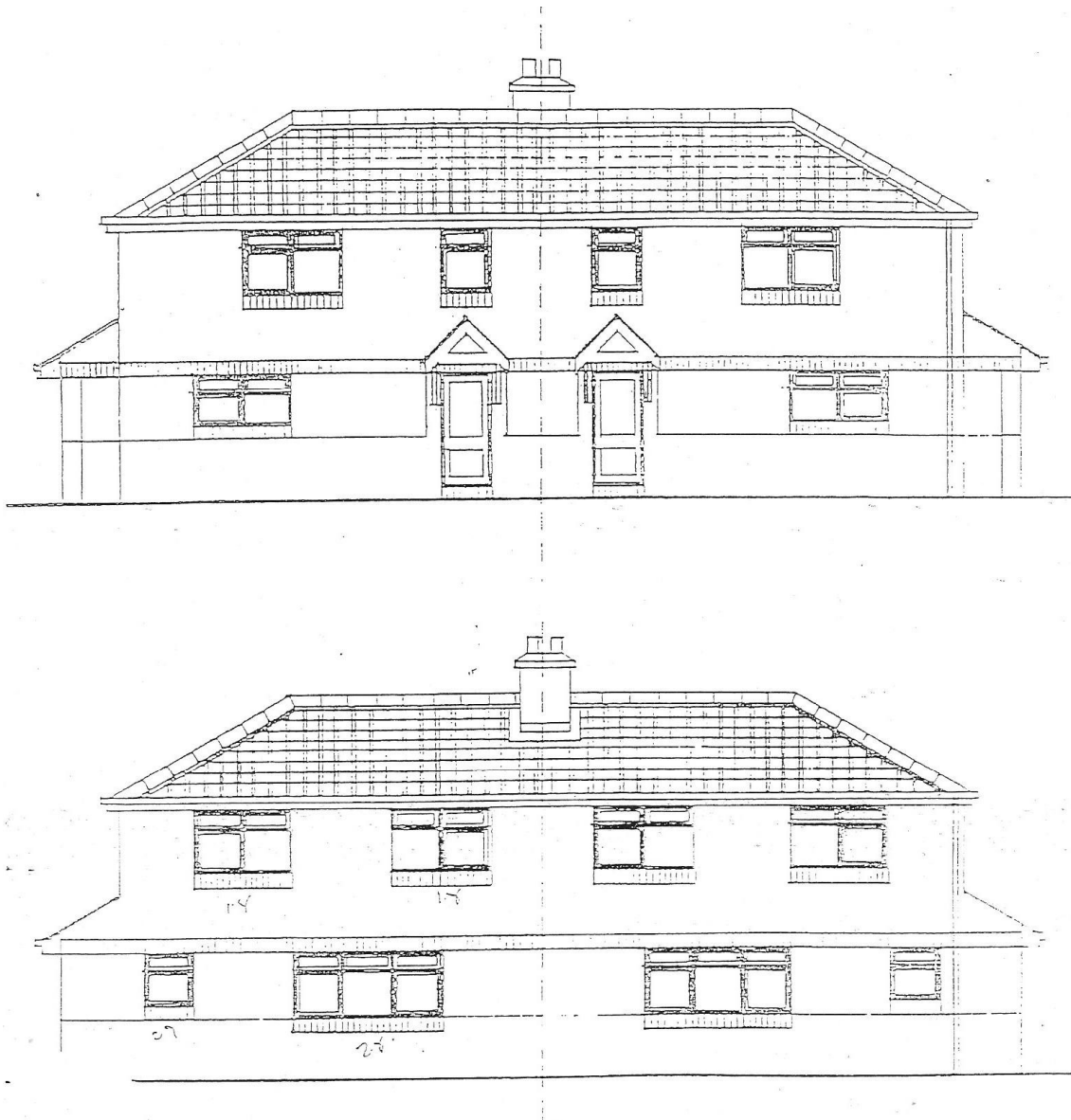


FIG 1.1

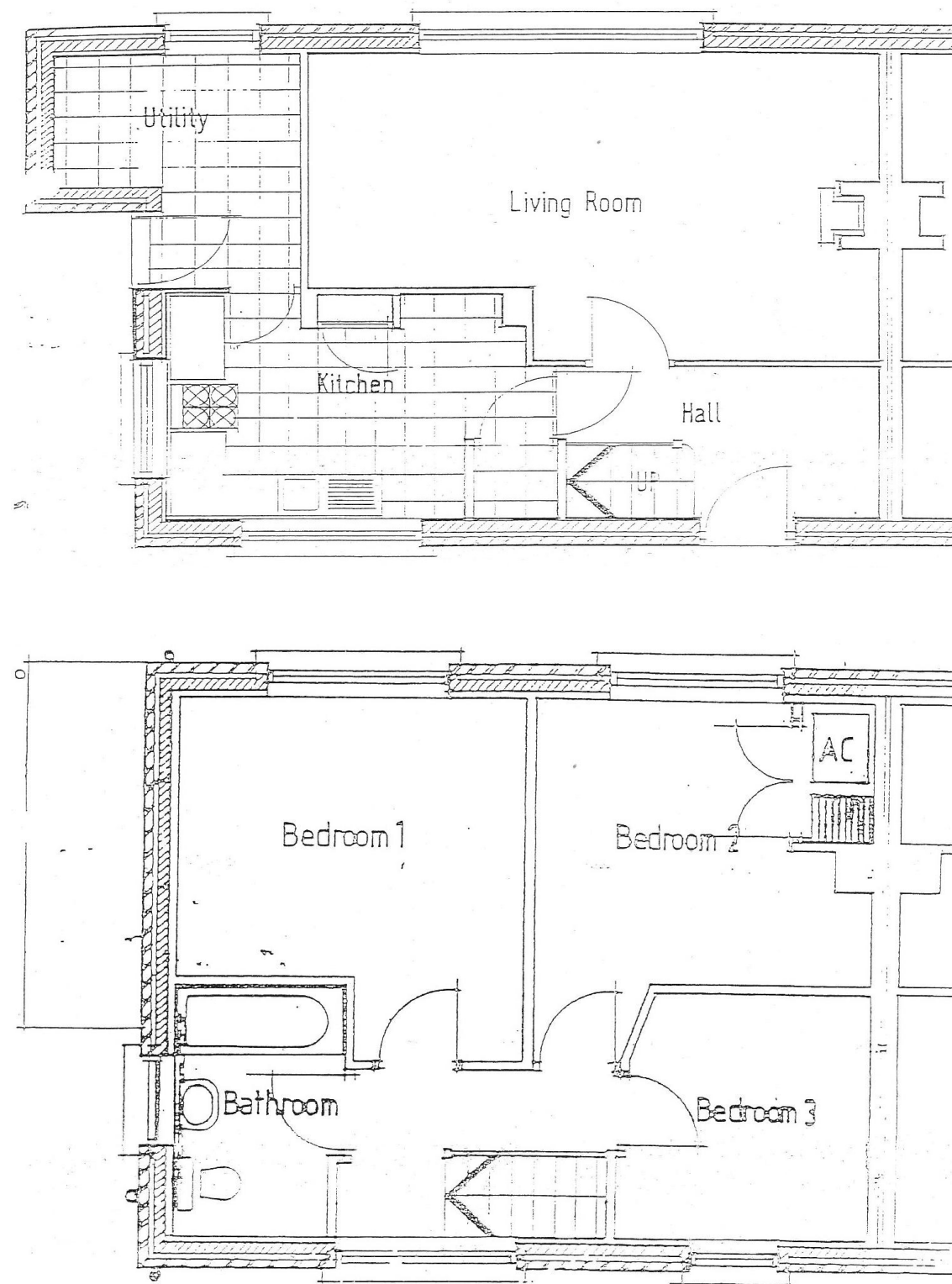


FIG 1.2

