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CONSULTING CIVIL & STRUCTURAL ENGINEERS

Chester Terrace Retaining Wall – Scheme Proposals and Pricing Summary Document
HPM DOC 24509-211213(REV07)



Project No. 24509/DMC/JRH
13th December 2021 (REV07)

REVISION NOTES – REV07:

- 1) Prices updated to reflect BuildT cost plan revision Oct. 2021 R6.
- 2) Option 5 (phased construction) included.

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Scheme Reference	Foundations	Balustrade Works	Programme
Option 1	As Existing	Cosmetic Repairs	20 year programme
<i>Option 1A</i>	<i>As Existing</i>	<i>Repair and Pin</i>	<i>20 year programme</i>
<i>Option 1B</i>	<i>As Existing</i>	<i>Demountable</i>	<i>2 visits over 5 years</i>
Option 4	Concrete Retaining Wall & Piling	New	One Visit
<i>Option 4A</i>	<i>Concrete Retaining Wall & Piling</i>	<i>Repair and Pin</i>	<i>One Visit</i>
Option 5	New	New	Phased Construction

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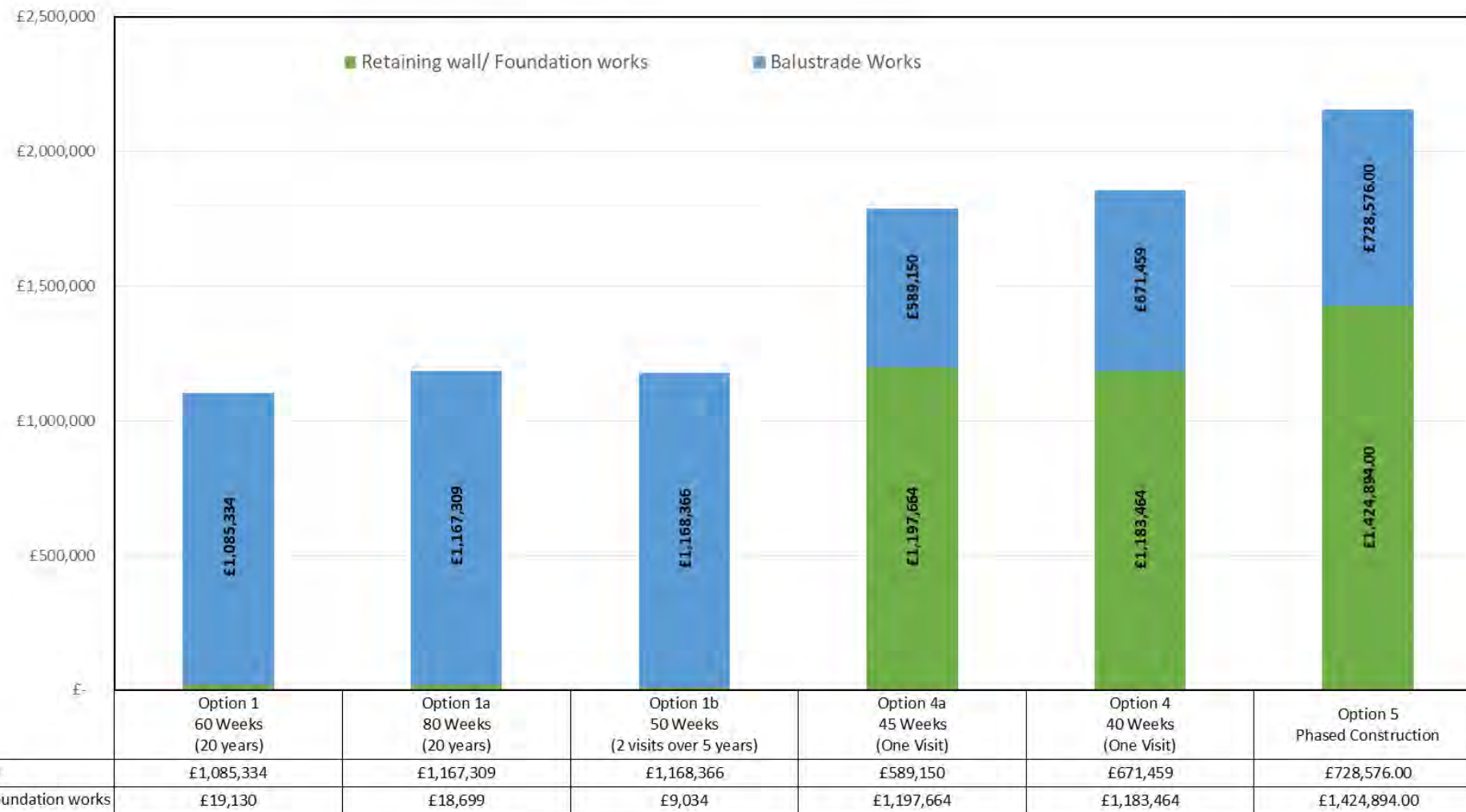
SCHEME PROPOSALS

DOCUMENT NOTES:

- The following document should be read in conjunction with HPM report: “RP201117 Chester Terrace Balustrade Addendum Report Issue 01”.
- This document is a summary of the schemes and proposals within that report. The limitations, conclusions and recommendations within that report also apply to this document.
- This document outlines the scheme proposals, produced by HPM, and the subsequent costs provided by Buildt Quantity Surveyors.
- The Buildt pricing document should be referred to for a breakdown of the costing (Spreadsheet version: CostPlanOct2021r6). That document includes various important assumptions and exclusions in each of the Options. The costings in this document should be understood in the context of those assumptions and exclusions plus that none of the Options have yet been designed.

Summary Table

Scheme Reference	Foundations	Balustrade Works	Programme	Weeks on Site	Retaining Wall/Foundation Works Cost	Balustrade Works Cost	Total Estimated Cost	Structural Condition (Relative to Current Standards)	Movement	Project Risk & Notes	
Option 1	As Existing	Cosmetic Repairs	20 year	60	Year 1: £8,066 Years 2-20: £11,063	Year 1: £442,599 Years 2-20: £642,735	£1,104,464	Foundations & balustrade structurally inadequate for loading	Subject to ongoing movement	Inherent risks	
Option 1A	As Existing	Repair and Pin	20 year	80	Year 1: £8,066 Years 2-20: £10,632	Year 1: £474,134 Years 2-20: £693,174	£1,186,007	Foundations & balustrade structurally inadequate for loading	Subject to ongoing movement	Inherent risks	
Option 1B	As Existing	Demountable	2 Visits over 5 years	50	Year 1: £9,034 Year 2-20: exc.	Year 1: £597,010 Year 2-20: £571,356	£1,177,698	Structural system is not structurally adequate for loading due to the foundations.	Subject to ongoing movements	Inherent risks	
Option 4	Concrete Retaining Wall & Piling	New	One Visit	40	£1,183,464	£671,459	£1,854,923	Foundations and balustrade structurally adequate for loadings.	No ongoing movement as a result of works.	Most intrusive works.	
Option 4A	Concrete Retaining Wall & Piling	Repair and Pin	One Visit	45	£1,197,664	£589,150	£1,786,813	Balustrade structurally inadequate for lateral loadings. Foundations adequate when works completed.	No ongoing movement from foundations. Balustrade will be subject to movement.	Most intrusive works & Balustrade inadequate.	
Option 5	Phase 1	New	New	One Visit	22	£484,241	£226,482	£710,722	Foundations and balustrade structurally adequate for loadings.	No ongoing movement as a result of works.	Most intrusive works.
	Phase 2	New	New	One Visit	28	£544,758 <i>(price based on current rates and does not consider inflation at time of works)</i>	£306,766 <i>(price based on current rates and does not consider inflation at time of works)</i>	£851,524 <i>(price based on current rates and does not consider inflation at time of works)</i>	When works complete the foundations and balustrade will be structurally adequate for loadings.	When works are completed there will no longer be ongoing movement.	Most intrusive works.
	Phase 3	New	New	One Visit	22	£395,895 <i>(price based on current rates and does not consider inflation at time of works)</i>	£195,328 <i>(price based on current rates and does not consider inflation at time of works)</i>	£591,223 <i>(price based on current rates and does not consider inflation at time of works)</i>	When works complete the foundations and balustrade will be structurally adequate for loadings.	When works are completed there will no longer be ongoing movement.	Most intrusive works.
	Total	New	New	3 Visits – Programme T.B.C	See Above	£1,424,894	£728,576	£2,153,470* <i>(* - Final price does not include surveys or inflation at time of works for phase 2 & 3)</i>	When all phases are complete the foundations and balustrade will be structurally adequate for loadings.	When all phases are complete there will no longer be ongoing movement.	Most intrusive works & continued surveying required until phases 2 & 3 completed.



Scheme	Option 1	Option 1a	Option 1b	Option 4a	Option 4	Option 5
Total Cost	£1,104,464	£1,186,007	£1,177,698	£1,786,813	£1,854,923	£2,153,470*
Foundations	Cosmetic	Cosmetic	Cosmetic	Structural	Structural	Structural**
Balustrade	Cosmetic	Cosmetic	Demountable	Cosmetic	Structural	Structural**
Structural Condition	Inadequate	Inadequate	Inadequate	Inadequate	Adequate	Adequate**
Movement	Yes	Yes	Yes	Yes	No	No**
Project Risk & Notes	Inherent	Inherent	Inherent	Intrusive works & balustrade inadequate.	Intrusive works	Phased works subject to findings of surveys. <ul style="list-style-type: none"> - Survey price not included nor inflation for phases 2 & 3. ** - Only achieved following completion of every phase of work.

Scheme Reference	Foundations	Balustrade Works	Programme
Option 1	As Existing	Cosmetic Repairs	20 year programme

Summary:

Cosmetic repairs to balustrade including replacement of 250 bottles. Balustrade re-installed with original fixings. Works carried out as and when required, assuming completion over 20 years.

Positives	Negatives
The cost of Repair Scenario 1 is the lowest.	Following the repairs, the balustrades can be as strong as when they were originally constructed. As established in our original report, the balustrades will however not have sufficient strength to resist contemporary lateral loads.
The vegetation and trees in the garden will not be affected.	The retaining walls and foundations will be subject to ongoing movement as a result of inadequately sized foundations, foundations being founded on made ground, tree root action on the clay type ground and lateral loading arising from surcharge on the road. Therefore, ongoing repairs will be required.

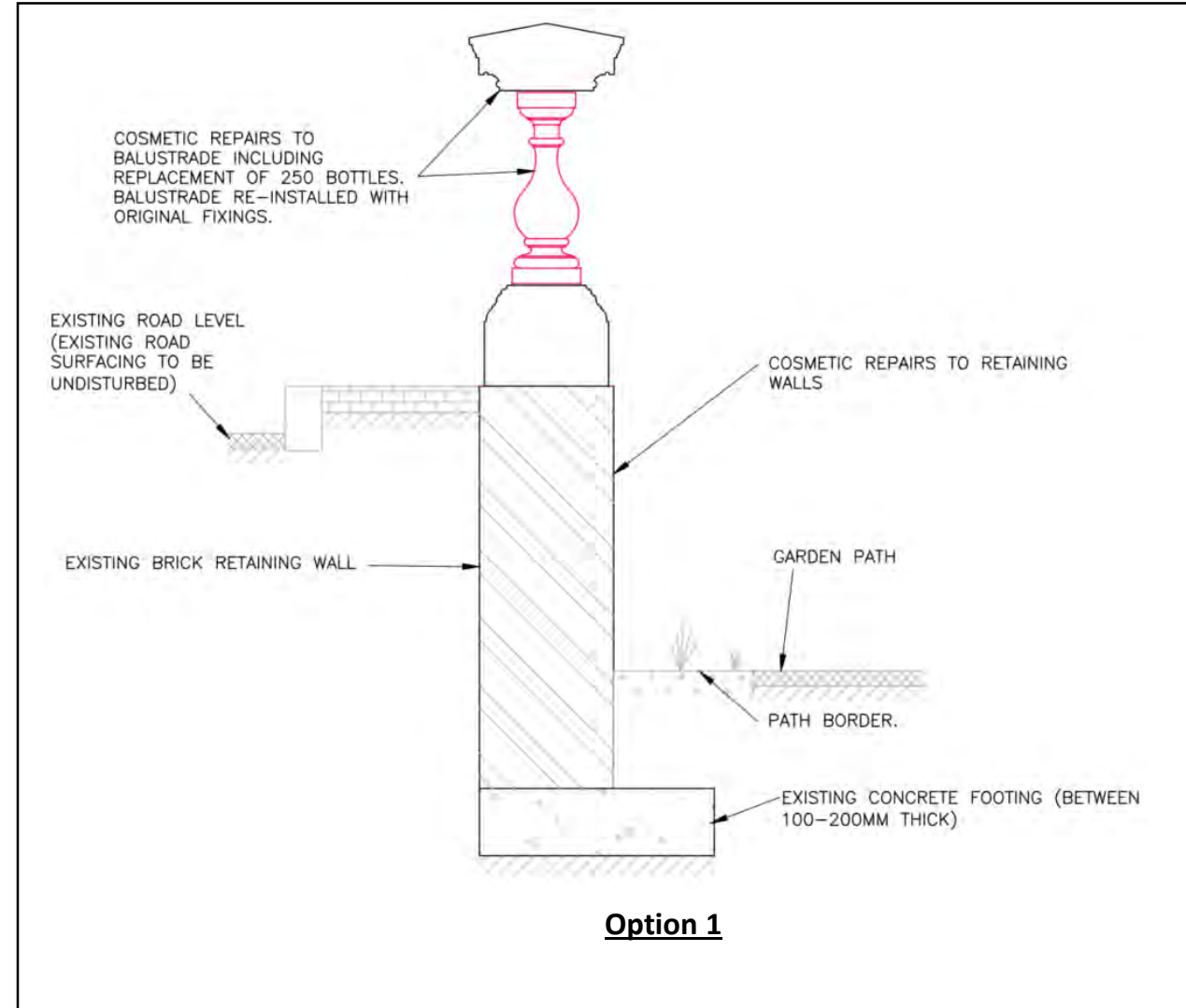
Pros vs Cons

Years	Retaining Wall & Foundation	Balustrade Works	Anticipated Cost
Year 1	£8,066	£442,599	£450,665
Years 2-20	£11,064	£642,735	£653,799
Total	£19,130	£1,085,334	£1,104,464

Cost Analysis

Weeks on Site	Duration
60 Weeks	20 Years

Project Duration



TOTAL COST OVER 20 YEARS: £1,104,464

Scheme Reference	Foundations	Balustrade Works	Programme
Option 1A	As Existing	Repair and Pin	20 year programme

Summary:

Repair and pinning to balustrade. Works carried out as and when required, assuming completion over 20 years.

Positives	Negatives
The vegetation and trees in the garden will not be affected.	Following the repairs, the balustrades can be as strong as when they were originally constructed. As established in our original report, the balustrades will however not have sufficient strength to resist contemporary lateral loads.
	The retaining walls and foundations will be subject to ongoing movement as a result of inadequately sized foundations, foundations being founded on made ground, tree root action on the clay type ground and lateral loading arising from surcharge on the road. Therefore, ongoing repairs will be required.

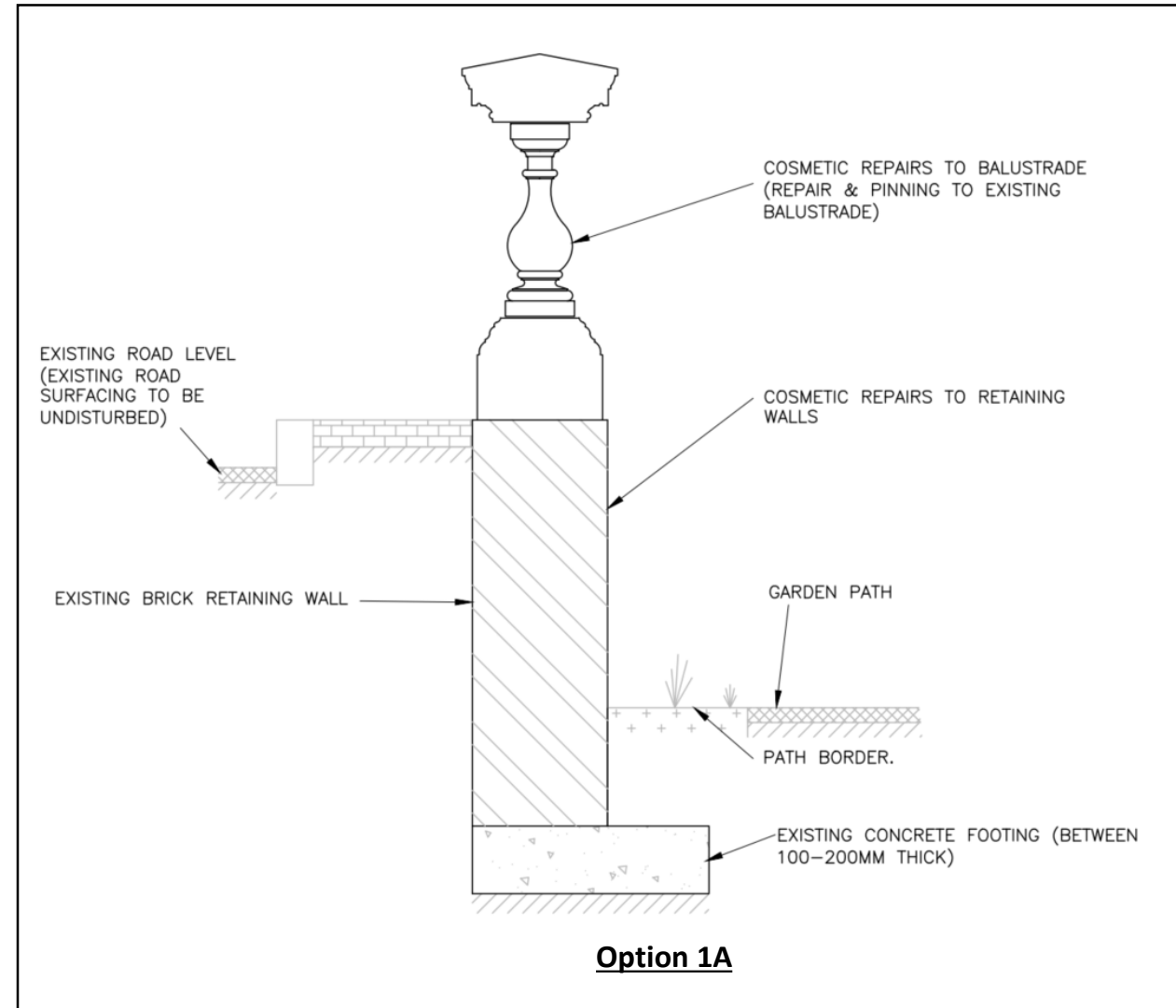
Pros vs Cons

Years	Retaining Wall & Foundation	Balustrade Works	Anticipated Cost
Year 1	£8,066	£474,134	£482,200
Years 2-20	£10,633	£693,175	£703,808
Total	£18,699	£1,167,309	£1,186,007

Cost Analysis

Weeks on Site	Duration
80 Weeks	20 Years

Project Duration



TOTAL COST OVER 20 YEARS: £1,186,007

Scheme Reference	Foundations	Balustrade Works	Programme
<i>Option 1B</i>	<i>As Existing</i>	<i>Demountable</i>	<i>2 visits over 5 years</i>

Summary:

New demountable balustrade and minor repairs to existing retaining wall during initial visit. Future removal of balustrade and, re-erection on new retaining structure (new retaining structure costed elsewhere).

Positives	Negatives
The vegetation and trees in the garden will not be affected.	The retaining walls and foundations will be subject to ongoing movement due to the ground conditions.
Can be demounted for future retaining wall works as required.	The resulting structural system is not structurally adequate for contemporary loading due to the limitations of the retaining wall/foundations.
Low initial cost.	If the requirement for complete retaining wall replacement arises in the future it will cost more than option 4.

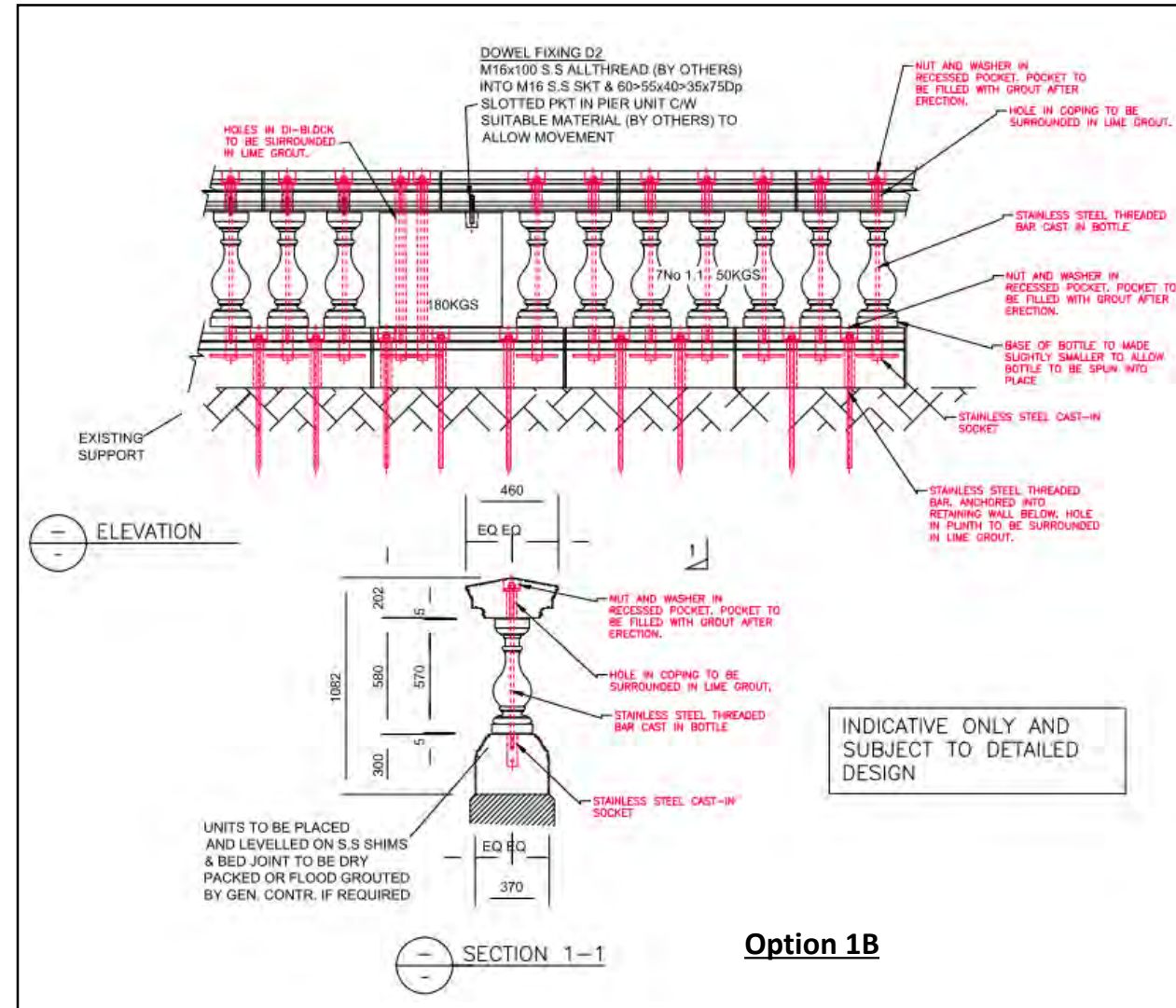
Pros vs Cons

Years	Retaining Wall & Foundation	Balustrade Works	Anticipated Cost
Year 1	£9,034	£597,010	£606,044
Years 2-20	x	£571,356	£571,356
Total	£9,034	£1,168,366	£1,177,698

Cost Analysis

Weeks on Site	Duration
50 Weeks	2 Visits over 5 Years

Project Duration



TOTAL COST OVER 20 YEARS: £1,177,698

Scheme Reference	Foundations	Balustrade Works	Programme
Option 4	Concrete Retaining Wall & Piling	New	One Visit

Positives	Negatives
The balustrades will be strong enough to resist lateral loads	This repair scenario is the most intrusive, both on the trees and vegetation in the garden and the footpath along Chester Terrace.
The retaining walls will be strong enough to resist sliding and overturning	
With this solution, the installation of new elements means that any future maintenance requirement will be minimal compared with the other ones.	

Pros vs Cons

Retaining Wall & Foundation	Balustrade Works	Anticipated Cost
£1,183,464	£671,459	£1,854,923

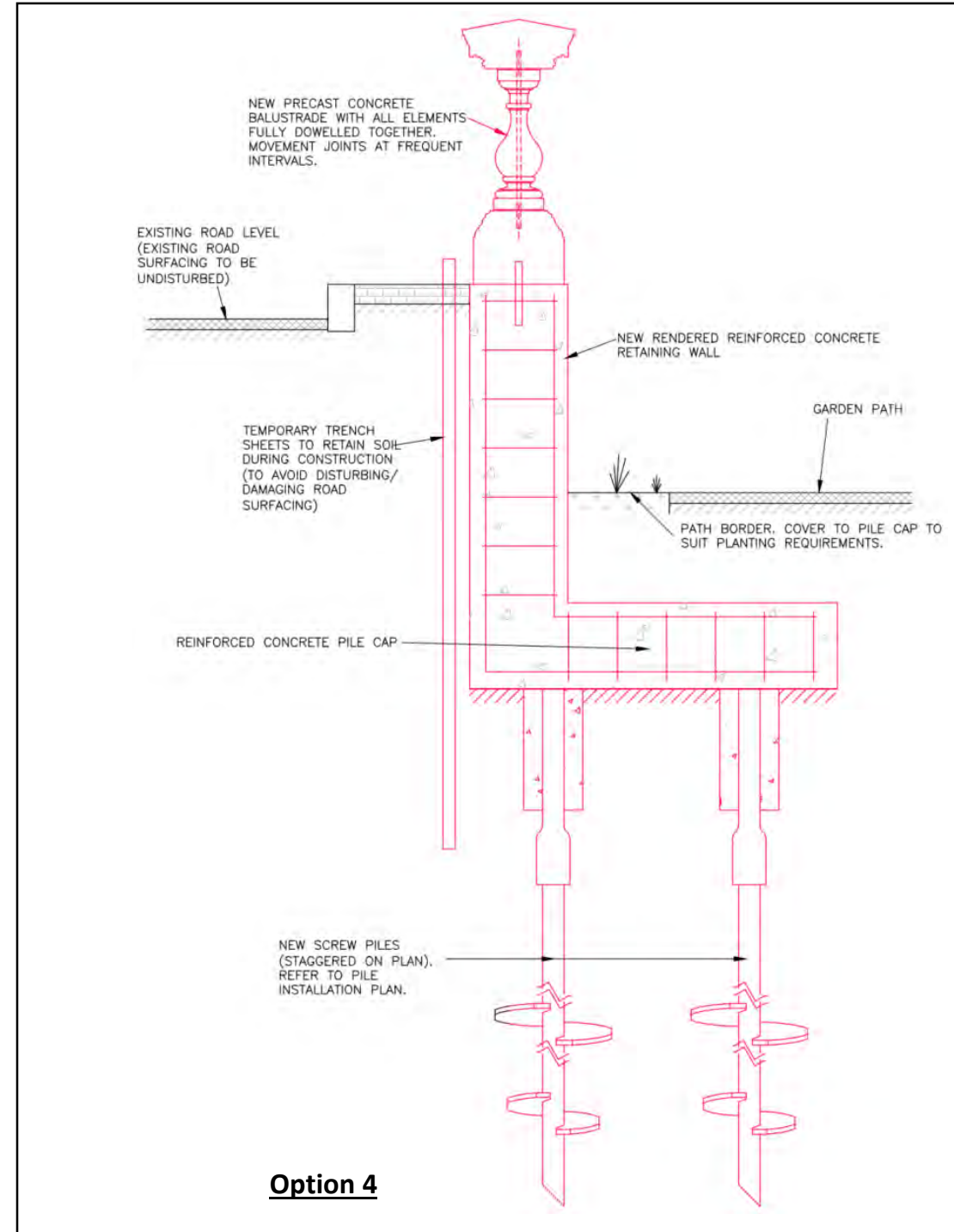
Cost Analysis

Weeks on Site	Duration
40 Weeks	One Visit

Project Duration

Summary:

Complete replacement of foundations and balustrade.



TOTAL: £1,854,923

Scheme Reference	Foundations	Balustrade Works	Programme
Option 4A	Concrete Retaining Wall & Piling	Repair and Pin	One Visit

Positives	Negatives
The retaining walls will be strong enough to resist sliding and overturning	This repair scenario is the most intrusive, both on the trees and vegetation in the garden and the footpath along Chester Terrace.
With this solution, the installation of new elements means that any future maintenance requirement will be minimal compared with the other ones.	

Pros vs Cons

Retaining Wall & Foundation	Balustrade Works	Anticipated Cost
£1,197,664	£589,150	£1,786,813

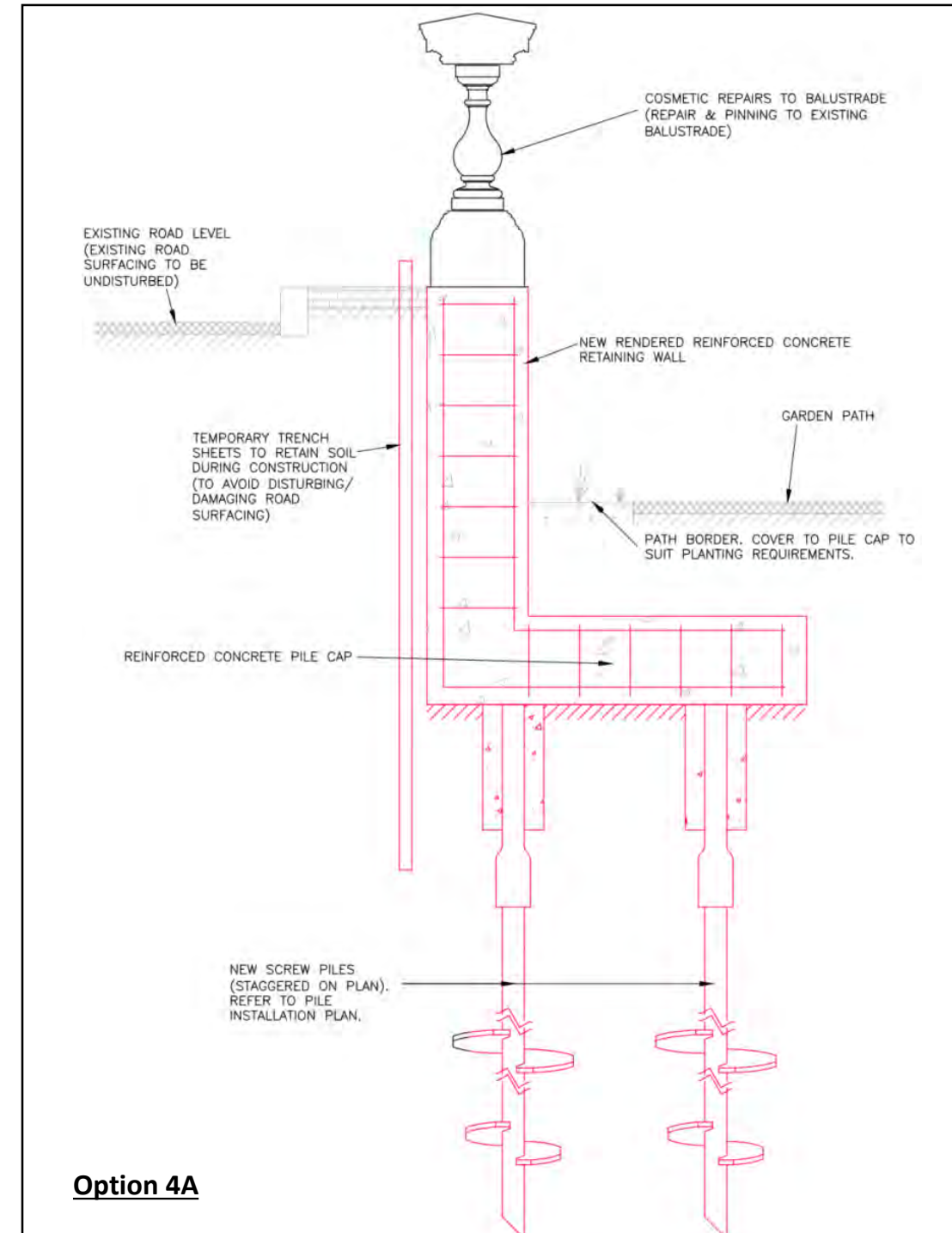
Cost Analysis

Weeks on Site	Duration
45 Weeks	One Visit

Project Duration

Summary:

Replacement of foundations. Repair and pinning to existing balustrade.



Option 4A

TOTAL: £1,786,813

Scheme Reference	Foundations	Balustrade Works	Programme
Option 5	New	New	One Visit (Phased)

Summary:

The complete replacement of foundations and balustrade completed in phases (phases split the wall into approximate thirds).

Positives	Negative
Following the completion of all the phases the retaining walls will be strong enough to resist sliding and overturning	This repair scenario is the most intrusive, both on the trees and vegetation in the garden and the footpath along Chester Terrace.
With this solution, the installation of new elements means that any future maintenance requirement will be minimal compared with the other ones.	The completion of the other 2 phases of work will be subject to the findings of monitoring surveys. These surveys will mean there are ongoing costs associated with the project.

Pros vs Cons

	Retaining Wall & Foundation	Balustrade Works	Anticipated Cost	Weeks on Site
Phase 1 (Bays L to P)	£484,241	£226,482	£710,722	22
Phase 2 (Bays F to K)	£544,758†	£306,766†	£851,524†	28
Phase 3 (Bays B to E)	£395,895†	£195,328†	£591,223†	22
Total	£1,424,894	£728,576	£2,153,470*†	See Above

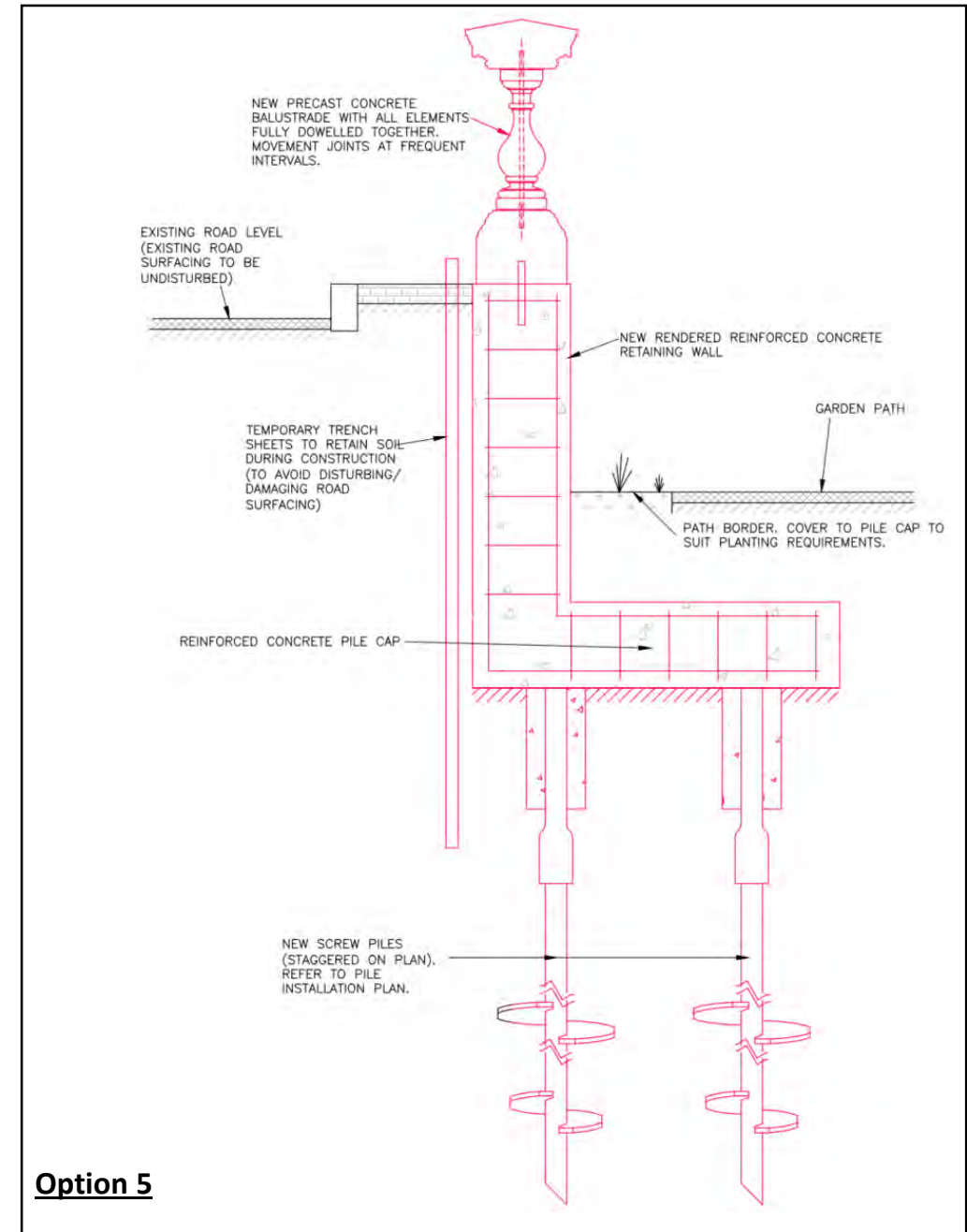
Cost Analysis & Project Duration

Survey Element	Duration
Set-up cost + initial readings	£2,160 (one off cost)
Annual cost based on monthly visits	£4,860 (a year until phase 2 & 3 completed)

Survey Costs

† - Prices for Phases 2 & 3 are based off present day rates. As it is unknown when Phases 2 & 3 would be completed the quoted prices do not account for inflation at the time of construction.

* - Final cost does not account for price of monitoring surveys required to assess extent of movement on the phases of wall that are yet to be completed.



Option 5

TOTAL: £2,153,470*†