Tay Road Bridge

TAY ROAD BRIDGE JOINT BOARD

Asset Management Lifecycle Plan

Prepared by:	Alan Hutchison
Reviewed by:	Bill Angus

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1. Current Status

1.1 Current Issues

There are no current issues.

1.2 Current Asset Management Strategy

In keeping with the need to demonstrate best value and a structured approach to inspection and maintenance, the Tay Road Bridge Joint Board (TRBJB) is implementing a full Asset Management Plan, using guidance from SCOTS (Society of Chief Officers of Transportation in Scotland).The regime will involve inspections in accordance with the Management of Highway Structures Code of Practice to record the condition of the structure. This information will be used to plan works to maintain or improve the condition of the bridge.

2. The Asset

2.1 Summary

The main Assets owned by the Tay Road Bridge Joint Board are as follows:-

a) Main Structure

42 span twin box girder bridge with composite Reinforced Concrete (RC) deck supported on RC columns and piers, and RC cellular abutments

b) Approach Spans

Earth embankments and elevated reinforced concrete structure comprising:

- Westbound Off ramp
- Eastbound Off ramp
- On ramp

c) Fife Underpass

Single span Reinforced Concrete box structure

d) Soil Nailed Slope, Newport Road

Engineered slope (Soil Nails) approximately 40m in length supporting the Fife Abutment access road above the B946 Newport Road.

e) Buildings

Bridge Office and Workshops – Marine Parade, Dundee

Kiosk and Toilet Block in the Fife Car Park

f) Fife Car Park

Surfaced car park and footways/cycle path with associated street furniture

2.2 Asset Register

Asset Description	Sub Elements
Tay Road Bridge – Main Structure	Carriageway including joints and road markings
	Superstructure – Deck
	Substructure – Piers and Abutments
	Central Walkway
	Parapets
	Self-propelled access gantries and runway beams
Tay Road Bridge – On/Off Ramps	Carriageway including joints and road markings
	Superstructure – Deck
	Substructure – Piers and Abutments
	Earth embankments
	Parapets
Pier protection (completed 2012)	Concrete aprons at Navigation Spans
Fife Underpass	Single Span Reinforced Concrete Box Structure
Ancillary Equipment	Street lighting columns, high mast columns lamps, cabling, feeder pillars
	Traffic signals, Wig-Wags, controllers, cabling
	Variable Message Signs, control cabinets, cabling
	Close Circuit Television Cameras, control cabinets, cabling
	Navigation lights, fog horn control cabinets, cabling

	Impressed Current Cathodic Protection System
Tay Road Bridge – Bridge Administration Office Building	Fabric of building and workshops
	Electrical systems
	Drainage
Tay Road Bridge – Fife Car Park	Surfacing including road markings
	Street furniture
	Street lighting
	Drainage
Tay Road Bridge – Kiosk and Toilet Building	Fabric of buildings
	Extraction/Ventilation System
	Electrical systems
	Drainage

Asset Description	Quantity	Unit
Main Deck	44900	sq m
Pier Protection Measures	3	No
North On/Off Ramps	7300	sq m
Carriageway Surfacing – Main Deck	30000	sq m
Fife Car Park - surfaced car parking area	3700	sq m
Fife Car Park – surfaced footways	620	sq m
Soil nailed slope, Newport Road	40	Lin m
Self propelled access gantries	2	No.
Street Lighting Columns and Heads	179	No.
CCTV Cameras	31	No.
Variable Message Signs (VMS)	16	No.
Navigation Lights	12	No.
Bridge Administration Building	1	No
Fife Kiosk & Toilet Building	1	No
Tay Road Bridge Administration Car Park	800	sq m

The Asset details are held in a mix of hard and electronic copy. It is the future intention of the TRBJB to utilise an appropriate electronic Structures Management System to store all data relating to the Asset.

2.3 Asset Growth

Due to the nature of the Asset there has been no effective growth since construction in 1966. Modifications to the north approach ramps were completed in 2014 as part of the Dundee Central Waterfront Development.

A major addition to the asset was the construction of pier collision protection measures completed in 2012.

The CCTV system covering the bridge and environs was renewed in 2017 to incorporate 31 digital cameras and a new recording system.

Six new Variable Message Signs (VMS) were installed on the Dundee Plaza (2 No.), bottom of the A92 (2 No.), and top of the B946 (2 No.) in 2017, along with the

installation of four new signs to replace obsolete signs on the bridge. Two VMS were installed on the Dundee approaches (Custom House and Slessor Gardens) in 2016.

A new passenger lift was installed and is due to be handed over to the TRBJB in December 2018.

The Administration Office Car Park was surfaced with asphalt in November 2017, and perimeter fences installed.

3 Service Expectations

3.1 Public expectations

The Tay Road Bridge is a vital asset in the national road network and it is crucial that a sustained long term programme of investment and maintenance is provided in order to ensure that the bridge is safe to use and fit for purpose and that it meets the demands and expectations highlighted below:-

- The capability of the bridge and approaches carry traffic loading as prescribed in current national standards
- Assess, maintain and replace as necessary road safety elements of the bridge e.g. parapets, safety fencing, road markings, signs and lighting, etc.
- Repair damage caused by bridge strikes, vehicle impact and vandalism
- Undertake reactive maintenance to prevent hazards and to minimise potential for third party claims against the TRBJB
- Management of works is carried out at a time and in a manner to minimise disruption to bridge users

Public expectation in terms of the ability to use the road network with the minimum delay to travel times is high, particularly as the Tay Road Bridge is a major commuter link between Dundee and north east Fife.

The main area of correspondence with the public does not relate to the condition of the asset but to restrictions imposed during periods of high winds and bridge closures due to Police incidents.

3.2 Use

Approximate composition of traffic using the bridge since bridge counters were reintroduced in 2016 is as follows:-

Vehicle Type	% Traffic
Cars/Light Vans	95.7%
Heavy Goods Vehicles (7.5 tonnes and above)	2.6%
Public Transport Vehicles	1.7%

Average daily traffic crossings of approximately 27,000 vehicles are recorded, approximating to 9,855,000 vehicles a year. The composition of Cars /Light Vans is 96%.

3.3 Safety Considerations

- Historically there are few road traffic accidents associated with the condition of the Tay Road Bridge
- Ongoing maintenance of the carriageway and lighting and signage will contribute to the ongoing safety of bridge users.
- The walkway was covered with anti-slip GRP sheeting by the end of 2015. This is an improvement to the asset. Ongoing maintenance of this by the in-house maintenance team is required to ensure GRP sheets remain secure.

3.4 Utility Activity

The Tay Road Bridge does not carry any buried Public utilities which could lead to a deterioration of condition of the bridge surfacing or cause delays and disruption generally associated with Utilities Works.

3.5 Third Party Claims

The number of Third party claims received over the past 12 years is 26
The number of claims paid over the past 12 years is 4
The cost of Third party claims paid over the past 12 years was £11,902.69

The general pattern of claims relate to alleged damage to vehicles caused by minor carriageway defects and debris.

3.6 Environmental Considerations

There are few specific environmental issues associated with the management and operation of the Tay Road Bridge.

The bridge gullies are drained directly into the River Tay which would not be permitted under current legislation. In order to minimise the environmental effects of run-off from the bridge and to protect the bridge structure from degradation caused by road salts, an inert de-icing solution (potassium acetate) is used as a de-icing fluid.

3.7 Network Availability Considerations

Due to the pattern of usage, works programmed by the TRBJB or external contractors are limited to off peak periods. The period during which works are permitted are:-

Southbound – between 09:30 and 15:30
Northbound- no work prior to 09:30 but no evening restriction
Full Closures – limited to 01:00 and 04:00

3.8 Amenity Value Considerations

There are no specific amenity value considerations relating to the Tay Road Bridge.

4 Management Practices

4.1 Policies

Prior to the implementation of the Asset Management Plan, the Tay Road Bridge did not have any formal policies on the management of the Tay Road Bridge. However the bridge has been inspected and maintained in accordance with general custom and practice used nationally by the majority of bridge owners.

4.2 Inspection Regime

The inspection regime undertaken at the Tay Road Bridge has generally followed the recommended frequency for inspections, in accordance with the Code of Practice for the Management of Highway Structures is as follows:-

Inspection Type	Frequency	Description
General	2 years	Visual examination
Principal	6 years	All elements inspected within touching distance and physical testing as required
Special	As necessary	As required following damage, change of loading or deterioration of a structures condition
Assessment	As necessary	Inspection required prior to carrying out a load carrying capacity assessment

The majority of General and Principal Inspections are carried out by TRBJB staff augmented by resources from specialist consultants as and when required e.g inspection of columns by abseilers.

The majority of the main structural elements are in locations with difficult access and require the use of the self-propelled inspection gantries.

The current output of these inspections is generally in electron report format.

The Tay Road Bridge Joint Board utilises an inspection regime which is compliant with the "Management of Highway Structures – An Approved Code of Practice"

4.3 Condition Assessment

In line with the "Management of Highway Structures – An Approved Code of Practice", either a Chartered Civil Engineer (the Bridge Manager) or Chartered Highways and Transportation Engineer (the Maintenance and Operations Manager) undertakes the inspections along with an in house appointed Assistant Bridge Inspector. The Bridge Manager is responsible for liaising with the Engineer to the Board to discuss asset condition and developing a forward 20 year programme of capital works. Notes and minutes of these meetings are held by the Engineer to the Board.

4.4 Construction/Asset Acquisition

Given the nature of the Tay Road Bridge Joint Board there are no major assets acquired.

4.5 Routine Maintenance

Routine reactive repairs that are identified during the bridge inspection process are prioritised by the Engineer to the Board and the Bridge Manager. There is no formalised priority hierarchy or response times in place. It is not considered necessary to utilise such systems for a single asset such as the Tay Road Bridge.

4.6 Operational/Cyclic Maintenance

Cyclic maintenance such as gully emptying, carriageway cleaning is contracted out to Dundee City Council's Environment Department. Ad hoc repairs to the carriageway to remove hazards to bridge users in the short term until permanent repairs are effected is completed by in-house staff.

4.7 Planned Maintenance

Renewals

The main elements requiring regular renewal are:

Expansion Joints	20 years
Carriageway Surfacing	20 years
Bearings	30 years

The bridge bearings were replaced in 2007/08 and it is currently anticipated that replacement of the carriageway surfacing and bridge expansion joints will be completed by 2022.

Major Maintenance

The main element requiring major maintenance is the paintwork to the steel box girders. The periods for painting maintenance are generally as follows:-

Intermediate maintenance	7 years
Repaint	15 years

Major renewal/maintenance works are contained in the TRBJB Capital Works Programme.

4.8 Disposal

The TRBJB does not have a formal policy on the disposal of major assets but each case would be individually considered by the Board.

5 Investment

Prior to February 2008, income from the collection of tolls was reinvested in the bridge by way of routine and major maintenance schemes. Since February 2008 funding has come directly from the Scottish Government, via liaison with Transport Scotland, and all items of major capital expenditure are subject to prioritisation and submission for funding. Meetings between Transport Scotland and TRBJB Officers take place twice a year and are recorded by Minutes.

5.1 Historical Investment

Revenue

Revenue expenditure has generally been maintained at a level whereby routine and minor reactive works can be accommodated. Unlike most structures, the Tay Road Bridge has a number of electronic systems, such as cathodic protection, which requires monitoring and management in addition to the normal routine maintenance areas such as surfacing etc.

Capital

The capital investment since 1985 is given below:

Year	Work	Cost
1985-89	Replacement of Gantries and Runway Beams	£2.5M
	Outer Parapet Refurbishment	
1985-91	Replacement of carriageway expansion joints	£1.5M
1987 - 94	Repairs to concrete columns and installation of cathodic protection system	£4.5M
1990-95	Major repainting works	£5.5M
1998	Refurbishment of central walkway	£4.5M
2002-03	Internal Box Girder Strengthening	£4M
2005 - 08	Bearing replacement	£18M
2009	Central Walkway Street Lighting Replacement	£0.25M
2010	Fife abutment bearing replacement	£0.7M
2010	Fife Car Park Slope Stabilisation	£0.1M
2012	Pier Collision Protection Works	£19M
2015	Walkway Surfacing	£0.5M
2016/17	CCTV	£0.16M
2017	VMS	£0.175M
2017	Administration Office Car Park	£0.06M
2018	Passenger Lift	£0.091M
	Total	£61.536M

5.2 Output From Investment

Investment will ensure that the Tay Road Bridge will continue to safely serve all bridge users throughout its life.

5.3 Forecasting Financial Needs

There is no documented process for establishing budgetary needs. All items of major Capital expenditure are prioritised and included in the TRBJB's 20 year capital plan. This information is used for submission to the Scottish Government for funding applications.

In addition to the long term capital plan the Engineer to the Board and the Bridge Manager prepare a rolling 3 year programme which is submitted to the TRBJB for approval on an annual basis.

The needs of a major structure such as the Tay Road Bridge vary compared to that of a Roads Authority who own a mixture of structures. In general the Organisation for Economic Cooperation and Development (OECD) suggest that an Authority should invest 1% of the value of the bridge stock per annum in maintenance and repair. At an approximate value of £130M this would equate to £1.3M per annum. Given the scale of the works the majority of maintenance schemes will be in excess of this value and details are given in the draft 20 year capital plan.

5.4 Valuation

The most recent estimate of the cost of reconstruction of the main bridge structure is £130M. Currently the SCOTS Asset Management Group is looking at the valuation of structures and their guidance will be used for calculating the Total Depreciated Replacement Cost, which represents the estimate of the current book value of an asset. This reflects the fact that a proportion of the asset has been consumed/used up as a result of use and ageing.

6 Forward Works Programme

6.2 Existing Programmes

Capital Works

The Engineer to the Board and the Bridge Manager jointly produce long and medium term programmes for Capital Works. The long term programme covers works up to 20 years in the future while the medium term programme covers a period of 3 years. The 3 year Capital Programme is subject to approval by the full Joint Board. The current approved 3 year Capital Plan is attached in Appendix A.

Revenue Works

The Bridge Manager prepares an annual programme of Revenue Works consisting of cyclic and routine maintenance, required for the general safety and operating efficiency of the bridge and includes the upkeep of all electronic equipment such as variable message signs, weather monitoring and lighting equipment.

In addition to planned maintenance reactive maintenance is carried out on an ad hoc basis by the Board's Maintenance staff.

These works are covered by the annual Revenue Grant supplied by the Scottish Government.

6.3 Programme Coordination

As a single asset entity there is no real requirement for programme coordination. Timing of the works is considered in terms of potential effects on delays and disruption to bridge users and coordination with neighbouring Roads Authorities is carried out to avoid overlap of works.

6.4 Option Appraisal

There is no formal Option Appraisal process other than all major works schemes are taken to the TRBJB for approval. Any reports will include a range of options and a recommended course of action for approval by the TRBJB.

7 Risk

The TRBJB has adopted a Corporate Risk Management strategy that examines all risks associated with the TRBJB's management of the bridge. This strategy is subject to review on a regular basis and is approved by the Board. It is recognised that it is not possible to remove all risks but the risk management strategy allows risks to be quantified and managed appropriately.

A copy of the Corporate Risk Strategy is attached in Appendix B.

8 Works Delivery and Procurement

The TRBJB seek to achieve best value in all works carried out on the bridge for both revenue and capital works.

All works carried out by external Contractors are procured in accordance with the TRBJB's approved tender procedures.

Routine maintenance works are carried out by the TRBJB's in house Maintenance workforce wherever possible.

9 Performance Management

There are no Statutory or Voluntary Performance measures used by the TRBJB as the bridge is a single asset.

Availability to traffic is measured and reported to the TRBJB on a quarterly basis.

10 Future Strategies

All Tay Road Bridge Inspectors are working towards obtaining the recently introduced (2018) Bridge Inspector Certification qualification, certified by Lantra on behalf of the UK Bridges Board and supported by Transport Scotland.

11 Service Improvement Actions

One area for Service Improvement is to improve the bridge inspection capabilities and reliability with the planned introduction of new bespoke and more efficient and reliable under carriageway inspection gantries in 2021/22.

APPENDIX A

TAY ROAD BRIDGE JOINT BOARD

PROPOSED CAPITAL EXPENDITURE PROGRAMME 2019/2020 - 2021/2022

	Projected Outturn 2018/19 £000	2019/20 £000	2020/21 £000	2021/22 £000
Project Title				
New Vehicles	-	30	-	30
Carriageway Resurfacing	20	200	3,600	3,600
CP Monitoring Equipment	150	-	-	-
CP Hardware	-	250	-	-
CP Replacement	-	-	-	250
Inspection of Columns and Piers	-	300	-	-
Replacement of Expansion Joints	25	25	750	750
Major Paintwork to Box Girders	-	-	-	100
Bridge Office Refurbishment	50	700	394	-
Lift Replacement	100	-	-	-
New Switch Gear	250	-	-	-
LED Lighting to Bridge & Fife Car Park	50	40	-	-
New Gantries	-	100	175	2,000
Scour Protection	-	-	25	225
Paintwork to Box Girders (CFCR)	-	25	25	-
Gantry – Miscellaneous (CFCR)	80	25	25	25
Miscellaneous Projects (CFCR)	20	100	100	100
	745	1,795	5,094	7,080
Funded by				
Capital Grant	645	750	tbc	tbc
Capital Grant carried forward from previous years	-	895	758	-
Capital Funded from Current Revenue (CFCR)	100	150	150	125
Capital Receipts	-	-	-	-
	745	1,795	908	125
Additional Capital Funding Required	-	-	4,186	6,955

APPENDIX B

Strategic Risk Register

No	Risk Description	Probability (P)	Severity (S)	Inherent Risk (P) x (S)	Existing Controls	Residual Risk	Further Action Required	Responsible Officer	Priority
Risk Category: External									
1	Change of Government with revised policies/strategies	3	4	12	N/A	3x4 =12	None	Clerk Treasurer	Amber
2	Legislative changes e.g. Health & Safety , Environmental, Procurement etc "Brexit" following referendum result June 2016	3	4	12	Maintain awareness of changes to legislation and amend policies and procedures timeously – Too early to say what impact Brexit will make.	3x3 = 9	Review and update Policies and Procedures on regular basis- monitor closely Government negotiations with European Union.	Clerk Bridge Manager Engineer	Amber
3	Effects of changes to Economy – budget limitations etc "Brexit" following referendum result June 2016	3	4	12	Financial planning, monitoring and control systems – Too early to say what impact Brexit will make.	3x3 = 9	None	Bridge Manager Treasurer	Amber

No	Risk Description	Probability (P)	Severity (S)	Inherent Risk (P) x (S)	Existing Controls	Residual Risk	Further Action Required	Responsible Officer	Priority
Risk Category: Operational									
4	Loss of structure/ operational capacity through ship impact/terrorism	3	5	15	Dundee Port Authority Controls. Insurance Provision of pier protection system at Navigation Spans Security of asset through CCTV and 24 hour site attendance	1x5 = 5	None	Bridge Manager Engineer	Green
5	Loss of structure/ operational capacity through effects of Dundee City Waterfront Development works	3	5	15	Major infrastructure Works in waterfront now complete- Left on Risk register as development plots still to be developed Asset Protection Agreement with DCC	1x2 = 2	Ongoing review of design and traffic management proposals throughout works	Bridge Manager Engineer	Green
6	Loss of operational capability through loss of bridge/buildings	2	5	10	Frequent inspection/maintenance of assets	2x4 = 8	None	Bridge Manager Engineer	Green
7	Losses through poor governance	3	5	15	Scheme of Delegation / Anti Fraud and Corruption Policy etc in place. Undertake Internal and External Audit	2x5 = 10	Continue to review and apply Governance Policies and Audits	Bridge Manager Treasurer	Green

8	Failure to deliver projects to time and/or cost	3	4	12	Major schemes submitted to Board for approval – None Pending at Present	2x3 = 6	Adopt robust project management procedures including Business Case preparation for schemes in excess of £50,000	Bridge Manager Engineer	Green
9	Lack of financial resources:-	3	3	9	Submission of applications for Grant in Aid to include robust estimates as back up. Monitor and control expenditure against agreed budgets	2x3 = 6	None	Bridge Manager Treasurer	Green
10	Lack of staff resources:- Pandemic Industrial Action Recruitment problems	3	3	9	Business Continuity plans Liaison/Consultation with Staff and Trade Unions on matters affecting staff Monitor/manage staff absences Monitor retiral dates and plan recruitment accordingly	3x2 =6	Review BC plans on regular basis Develop Staff Planning Strategy	Bridge Manager	Green

APPENDIX B
Risk Management Action Plan 2018-19

Subject	Task	Responsibility	Timescale	Update
Strategic	Maintain Risk Management Planning process	Bridge Manager	Annually	Ongoing
Operational	Review Risk Register	Bridge Manager	Annually	Ongoing
Operational	Test Business Continuity Plans	Bridge Manager	Annually	Ongoing

APPENDIX C 20 Year Capital Plan

TAY ROAD BRIDGE JOINT BOARD
20 YEAR PROGRAMME - 2011 to 2031

Project Title	2010/2011	2011/2012	2012/2013	2013/2014	2014/2015	2015/2016	2016/2017	2017/2018	2018/2019	2019/2020	2020/2021	2021/2022	2022/2023	2023/2024	2024/2025	2025/2026	2026/2027	2027/2028	2028/2029	2029/2030	2030/2031	Total	Comments
CAPITAL	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21		
CP Replacement												250,000	2,000,000	2,000,000	2,000,000	2,000,000	50,000					**8,300,000**	Potential CP replacement based on 30 year design life. CP intalled from 1991 to 1995 and Nav Spans in 2000.
CP Hardware										250,000												**250,000**	2019/20: Allowance for refurbishment to CP hardware timed to co-ordinate with inspection of Columns & Piers.
CP Monitoring Equipment							0		150,000													**150,000**	Replace CP Monitoring Equipment installed in 1996. Tender approval to be sought at Dec 2018 Board meeting.
Advanced Warning Signs	22,061	7,254	0	18,160										50,000	400,000	400,000	10,000					**907,475**	2010-11 Retention/Carry over from previous contract 2011-12 - design/procurement of replacement signs in Dundee 2013/14 Works costs for replacement signs
North Approach Viaducts Remedial Works	33,812	6,887	0	166,027																		**206,726**	Works to remaining half joints on the North Approach Viaducts carried out at the same time as Dundee Central Waterfront promoted works to the approach spans. Works completed 2015.
Carriageway Resurfacing		6,000	5,028	90,270	210,712	0	-	-	20,000	200,000	3,600,000	3,600,000	75,000									**7,807,010**	SCRIM test completed Nov 2018. Results are being evaluated. Allowance for retexturing/works as necessary.Later complete replacement assumes waterproofing is required. Programmed to be carried out at same time as expansion joint replacement.
Replacement of Expansion Joints					60,000	1,100	0	3,728	25,000	25,000	750,000	750,000	50,000									**1,664,828**	Replacement of expansion joints. First set installed in 1989. Programmed to be carried out at same time as carriageway resurfacing.
Parapet refurbishment/replacement																150,000	1,500,000	1,500,000	25,000			**3,175,000**	Outer parapets refurbished in 1988. Inner parapets renewed in 1998. Inspection in 2015 confirms as good condition.
Central Walkway Surfacing Replacement						461,845	6,552															**468,397**	GRP panels installed in 2015.
Bearing Replacement																						**0**	Piers 2 to 29 and 35 to 41. Completed in May 2008. 30 year design life.
Runway Beam Bracket Replacements	104,905																					**104,905**	Remedial Works to runway beam expansion joint brackets. Works completed in Aug 2010.
Major Paintwork to Box Girders				0	0	0	14,456					100,000	4,000,000	4,000,000	4,000,000	4,000,000	4,000,000	60,000	0	0	50,000	**20,224,456**	External surfaces fully repainted from 1990 to 1995 with Acrylated Rubber system requiring major maintenance after 12 years. Painting Maintenance Strategy Report completed Dec 2009. Minor works moved to CFCR from 2017/18. Recommended removal of AR system starting in summer 2022. Independent specialist paint inspection carried out in summer 2016. Paint system generally in good condition with major maintenance anticipated in 2022/23. Works to be phased over 5 years.
Inspection of Columns and Piers			87,156	15,454					0	300,000						300,000						**702,610**	Abseil inspections within defined inspection frequencies and subsequent repairs.
Gantry - Miscellaneous	121,491	14,055	800	21,638	69,688	14,244	0															**241,916**	Moved to CFCR from 2017/18.
New Gantries										100,000	175,000	2,000,000	50,000									**2,325,000**	Existing gantries fully operational in 1992. Major upgrade completed in 2011/12. 2019/20: Brought forward £100k in recognition of lead-in time for consultant engineer's proposals.
Weather Monitoring Equipment etc			13,543	5,480														30,000				**49,023**	Upgrading/replacing weather monitoring equipment on bridge (installed 2017).
Ice Detection Equipment					7,941																	**7,941**	Upgrading/replacing ice detection equipment on bridge (installed early 1990s).
CCTV						0		159,023														**159,023**	Replace CCTV Equipment installed late 1990s.
Lift Replacement									100,000													**100,000**	New lift contract almost complete.
Fire Alarm/Gas Flooding and Fire Doors									250,000													**250,000**	Switch gear is 31 years old and needs replaced. Contract awarded, works due to commence Jan 2019.
Bridge Office Property Refurbishment								55,932	50,000	700,000	394,068											**1,200,000**	Office constructed 1966. Minimal works carried out to date on 52 year old building. Current proposals are to renew defective flat roof, improve control room layout and insulation and renew defective office windows.
New Vehicles	36,110			0	19,961		20,520	142,920		30,000		30,000		30,000		30,000		30,000		30,000		**399,511**	Maintaining fleet in good order by rotational programme of regular replacement of vehicles.
Miscellaneous Projects and unforseen works (contingency allowance)	109,877	96,121	82,645	39,151	50,191	41,451	35,057															**454,493**	This is an annual contingency allowance to deal with unforeseen works, projects and issues that may arise. Moved to CFCR from 2017/18.
VMS								147,909															2017/18 = to replace 4x VMS on the bridge & 1 VMS at Fife Bridgehead.
Scour Protection	2,895										25,000	225,000					25,000	225,000				**502,895**	2009/10 comprehensive scour survey and report completed. Further scour surveys carried out as part of pier collision protection contract with final one in 2014/15 all ok. Scour surveys set thereafter at 6 year intervals with a provisional allowance for protection works the year after.
Pier Collision Protection to Navigation Spans (Piers 31 to 33)	1,140,182	5,951,676	10,300,710	0	389,871																	**17,782,439**	Piers 31 to 33 protected by a sacrificial pier collision protection system. ECI contractor VolkerStevin appointed. Works completed Dec 2012. 2 year maintenance period. Original budget £19.1 million. £1.32 million savings achieved.
Fife Abutment Bearing Replacement	104,433	39,553																				**143,986**	Works completed in March 2010. 30 year design life.
Bearing Replacement to Navigation Spans Piers 30 and 34																						**0**	Works completed in November 2008. 30 year design life.

Lighting Column Replacement																						0	Works completed in March 2009. 40 year design life.
Fife Retaining Wall	131,575																					131,575	Retaining wall removed and soil stabilisation works carried out. Works completed in April 2010.
LED Lighting to Bridge Carriageway, Bridge Walkway and Fife Car Park						0			50,000	40,000												90,000	Switch to LED lighting across Bridge/Walkway and in Fife Car Park. Anticipated future reduced maintenance and energy savings.Tender approval to be sought at Dec 2018 Board meeting.
TOTAL	1,807,341	6,121,546	10,489,882	356,179	808,364	518,640	76,585	509,513	645,000	1,645,000	4,944,068	6,955,000	6,175,000	6,080,000	6,400,000	6,880,000	5,585,000	1,845,000	25,000	30,000	50,000	67,947,118	
Budgeted Grant Funding		8,800,000	6,300,000	500,000	500,000	500,000	500,000	750,000	750,000														
Capital Grant carried forward from previous years		2,539,073	5,220,250	1,031,368	1,175,189	895,325	876,685	1,300,101	1,547,710	1,652,710	757,710												
Capital Receipts		2,723	1,000	0	28,500	0	0	7,123	0	0	0												
Difference		5,220,250	1,031,368	1,175,189	895,325	876,685	1,300,101	1,547,710	1,652,710	757,710	-284,068												
CFCR																							
Miscellaneous Projects								46,359	20,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	100,000	1,266,359	
Gantry Miscellaneous								40,160	80,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	25,000	420,160	
Maintenance Paintwork to Box Girders								0	0	25,000	25,000											50,000	
TOTAL								86,519	100,000	150,000	150,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	125,000	1,736,519	

Note: Costs based on present day values August 2016

KEY

	Critical
	Must Do
	Desirable
	Complete