



# List of Key Updates included in FBC 3.1 (19/07/19)

1) Fixed bug resulting in occasional difficulties signing Form BA0(1) and BA0(2).

## List of Key Updates included in FBC 3.0 (12/04/19)

- Updated Tool to run in Microsoft Excel 2016.
- 2) Updated Tool to run in Windows 10 while also remaining compatible with Windows 7.
- 3) Assessed Category of section calculated in accordance with NR/L2/CIV/035 and reported in results tables.
- 4) Comments may now be included on the results sheets. Comments are compiled onto a new results comments sheet.
- 5) Comment, warning and error registers no longer limit entries to 5 lines of text.
- The CRE must now select whether the Tracking Tables have been populated and checked, before Form BA0(1) can be signed.
- 7) 'Indeterminate' is now an option when selecting qualitative assessment result.
- 8) Amendments to Guidance Notes and Justification Reports to capture updates.
- 9) Ultimate moment of resistance calculations for RC flanged beams updated in accordance with with BD44/15 and 5.3.2.1B of NR/GN/CIV/025.
- 10) Maximum shear stress on RC calculation sheets updated in accordance with BD 44/15.
- Applied pedestrian live loads are now based on the footbridge category A-C, and the nominal nominal point load changed to 1.5kN, in accordance with NR/L3/CIV/023.
- 12) Enables Add-in' bug that caused problems opening the Tool amended.

## <u>List of Key Updates included in FBC 2.3 (22/09/17)</u>

- 1) Assessment Scenario information is now exported to CSAMS XML file for populating the CSAMS database.
- 2) Added error checking to the CSAMS XML exporting procedure, to ensure all required fields have been correctly populated by the user.

### <u>List of Key Updates included in FBC 2.2 (23/05/17)</u>

1) Input added to qualitative assessment pages to allow the identification of the leading minor element causing the qualitative assessment result. These entries are required for the generation of CSAMS XML, trying to generate the CSAMS XML without these populated will produce an error.

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# List of Key Updates included in FBC 2.1 (30/03/16)

- 1) Input added for footbridge loading requirement to NR/L3/CIV/006/01C
- 2) If the form code on the FormAA does not fully describe the deck, it is mandatory to provide the correct form code for the deck and the facility to do this has been added.
- 3) Additional fields provided to allow for correct BCMI references to be entered if an element is not correctly defined in sheets "Deck" and "Subdeck".
- The terms used to describe the condition of a section have been changed, choices include "As-built Condition", "Current Condition" and "Section with Defect". If "Section with Defect" is selected a Defect ID should be provided. Imports will handle the condition of section change as shown below.

Old Input	New input (when imported)
Full section	As-built Condition
Damaged section	Section with Defect

- 5) Information sources have been split into a "Date" and "By" field. On import the information from older assessments will be placed in the "By" field, the assessor should manually split the information into the newly created "Date" and "By" fields.
- 6) Added pop-up window to display import/calculation progress.
- 7) New functionality has been added to produce an XML which can be uploaded to the CSAMS database.

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# List of Key Updates included in FBC 2.0 (14/08/15)

- 1) Transfer from Excel 2003 to Excel 2010.
- 2) A new Assessment Menu has been added to fit with Excel 2010.
- 3) Guidance Notes have been removed from the Tool and are now provided as a stand alone PDF file.
- The Form AA0 and Form BA0 no longer contain an approved list of CREs. It is the responsibility of the Assessor to ensure each form is signed by a competent and approved person taking note that once signed the Form AA0 cannot be amended. Forms are signed using "Sign Forms" from the assessment menu. The signatures will now be checked and approved by Network Rail Structures Managers.
- Name and Title are now mandatory inputs on the Form AA0 and Form BA0 to facilitate approval by Network Rail Structure Managers.
- During Data Transfer results from the original file are compared to the updated file with any changes being flagged within the Tool on an additional tab which will become visible if changes have occurred. If no changes occur the Form BA0 signatures will be carried forward.
- A log file will be produced during Bulk Data Transfer which will show for each file if they contained Errors, Changes to the Results or Transferred without Change. This file will be saved in the output folder.
- B) During signing of the Form BA0 forms the inputs will be automatically checked to ensure no changes have been made since the calculation was run. If changes have been made, the calculation must be re-run before signing the forms.
- 9) Improvements to the efficiency of the Tool have been made throughout.

## List of Key Updates included in FBC 1.2 (25/06/13)

Amendments to the Reinforced Concrete calculations to prevent errors occurring.

### <u>List of Key Updates included in FBC 1.2 (25/06/13)</u>

- 1) Provision of XML database file is included. The XML file will be created automatically when the Form BA0(2) is signed. This feature is for Network Rail Structure Managers only.
- 2) Refinements have been made to the Guidance Notes for greater clarity.

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### **GUIDANCE NOTES**



Level 0 Assessment Tool Version FBC 3.1

## **List of Abbreviations used**

CRE Contractor's Responsible Engineer

Assmt Assessment Calculations
AC Assessed Category

Utilization factor

DL Dead load LL Live load

SDL Superimposed Dead Load

BM Bending moment
SF Shear force
SecProp Section Properties

Prop Properties

BCMI Bridge Condition Marking Index (not applicable to footbridges, but the priciples used herein)

DK Deck SD Subdeck

DCK Decking/plate/slab/jack arches incl. transverse troughing

MGE Main longitudinal beam/girder (exposed)

MGI Main longitudinal beam/girder (inner) incl. longitudinal troughing and filler beams

MG Reinforced concrete beam or slab

SL Reinforced concrete slab

PT Pre-tensioned concrete beam or slab

DC Transverse spanning reinforced concrete slab

Ed End Midspan

VE Position from support where shear enhancement is zero

CR Curtailment point for reinforcement

DS Damaged section AD Assessor Defined

c/c Centre to centre

b/w Between

CSAMS Civils Strategic Asset Management Solution

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No.	Topic	General note			
1	Level 0 process	The Level 0 assessment process has been developed in order to give Network Rail more contemporary bridge strength information which can be readily updated as new information becomes available or if changes are proposed. This Level 0 Assessment Tool has been developed to deliver these assessment calculations and a brief report; this will provide assessments in a common and familiar format which will greatly improve Network Rail's ability to manage their bridge stock.			
2	Level 0 process	This Level 0 Assessment Tool has been developed on the basis of NR/GN/CIV/025 Issue 3, NR/L3/CIV/020 (invoking BD 29/04 and BD 37/01), NR/L3/CIV/023 and BA 44/96.			
3	Level 0 process	The Level 0 assessments are prepared using an Assessment Tool that introduces various agreed simplifications to the assessment method in order to reduce the time required to collect and process assessment data into calculations which determine an assessed capacity based upon principal checks on key load carrying elements.			
4	Level 0 process	The assessor must determine the most reliable source of information. Generally the hierarchy of reliability for dimensional information will be:  1) Data confirmed on site 2) Data from record drawings 3) Data from drawings provided in assessment report 4) Data from assessment calculations.  The hierarchy of reliability for conditional information will be:  1) Data confirmed on site, 2) Data from Detailed examination.			
5	Use of the Tool	Data confirmed on site, 2) Data from Detailed examination.  The Level 0 assessment process and this Assessment Tool are designed for use by experienced railway assessment engineers and must only be undertaken by persons with suitable competency. Each assessing organisation must have at least one person of suitable experience to be the CRE to oversee the delivery of Level 0 Assessments.			
6	Use of the Tool	This Assessment Tool is created for Level 0 assessment of concrete footbridges, using Excel 2016.			
7	Use of the Tool	The Level 0 Tool should always be saved to and run from the C: drive of the user's PC. Running the Tool from a network location may impair functionality of Excel and the Level 0 Tool.			
8	Use of the Tool	The Tool will attempt to identify whether Excel 2016's Autosave function is active, and if so, disable it to avoid any inteference with its operation.  Autosave will automatically be disabled if the Tool is saved locally to the user's C: drive, as			
9	Scope of the Tool - General	per above.  This Level 0 Assessment Tool is designed to assess one bridge deck at a time. Structures with more than one deck will require multiple files - one for each deck. Files' names are standardized in the following format: FBC2_0_ELR-No-DKNo.xls			
10	Scope of the Tool - Elements articulation	Only simply supported elements may be assessed using this Level 0 Assessment Tool.			
11	Scope of the Tool - Only bridge spans greater than 2m and up to 30m (skew), and skews up to 20 degrees of the Only bridge spans greater than 2m and up to 30m (skew), and skews up to 20 degrees of the Only bridge spans greater than 2m and up to 30m (skew), and skews up to 20 degrees of the Only bridge spans greater than 2m and up to 30m (skew), and skews up to 20 degrees of the Only bridge spans greater than 2m and up to 30m (skew), and skews up to 20 degrees of the Only bridge spans greater than 2m and up to 30m (skew), and skews up to 20 degrees of the Only bridge spans greater than 2m and up to 30m (skew), and skews up to 20 degrees of the Only bridge spans greater than 2m and up to 30m (skew), and skews up to 20 degrees of the Only bridge spans greater than 2m and up to 30m (skew), and skews up to 20 degrees of the Only bridge spans greater than 2m and up to 30m (skew), and skews up to 20 degrees of the Only bridge spans greater than 2m and up to 30m (skew), and skews up to 20 degrees of the Only bridge spans greater than 2m and up to 30m (skew), and skews up to 20 degrees of the Only bridge spans greater than 2m and up to 30m (skew), and skews up to 20 degrees of the Only bridge spans greater than 2m and up to 30m (skew), and skews up to 20 degrees of the Only bridge spans greater than 2m and up to 30m (skew), and skews up to 20 degrees of the Only bridge spans greater than 2m and up to 30m (skew), and skews up to 20 degrees of the Only bridge spans greater than 2m and up to 30m (skew), and skews up to 20 degrees of the Only bridge spans greater than 2m and up to 30m (skew), and skews up to 20 degrees of the Only bridge spans greater than 2m and up to 30m (skew), and skews up to 20 degrees of the Only bridge spans greater than 2m and up to 30m (skew), and skews up to 20 degrees of the Only bridge spans greater than 2m and up to 30m (skew).				
12	Scope of the Tool - General arrangement limitations	This Level 0 Assessment Tool will consider decks comprising up to five main beams or discrete elements. Assessment of bridges with more than 5 main beams or discrete elements may be undertaken considering part of a deck.			
13	Scope of the The scope of assessment using this Level 0 Assessment Tool is limited to the following to				

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No. Topic General note		General note
This Level 0 Assessment Tool may be used to assess the following: Reinforced concrete beams arranged as discrete elements, Reinforced concrete slabs arranged as discrete elements, A single reinforced concrete slab, Reinforced concrete beams with a transverse spanning slab (flanged beams), Pre-tensioned beams arranged as discrete elements, Pre-tensioned beams arranged to form a single slab.		Reinforced concrete beams arranged as discrete elements, Reinforced concrete slabs arranged as discrete elements, A single reinforced concrete slab, Reinforced concrete beams with a transverse spanning slab (flanged beams), Pre-tensioned beams arranged as discrete elements,
15	Assessed elements are checked for:  Scope of the Tool - Capacity checks Shear - at a distance "d" from the supports, at the point closest to the support where no shear enhancement, at reinforcement curtailment points and at locations with datasections	
16	Scope of the Tool - Qualitative assessment Elements in deck supports and deck elements which are not covered in the assessment calculations, are assessed qualitatively.	
17	Scope of the Tool - Loading The Level 0 Assessment Tool uses a single pre-defined loading scenario. Scenarios	
18	Scope of the Tool - Loading Scenarios	The CSAMS database uses a pre-defined list of 'Assessment Scenarios' to classify the loading scenario assessed in the Level 0 Assessment Tool.  For the pre-defined footbridge loading scenario, the corresponding 'Assessment Scenario' is pre-set to "Standard Requirement" and cannot be changed.  For all qualitative assessment, the corresponding 'Assessment Scenario' is pre-set to "Qualitative" and cannot be changed.

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No.	Topic	General note
<del></del>		To use the Assessment Tool it is necessary for macros to be enabled. Go to
		"File/Options/Trust Centre/TrustCentre Settings/Macro Settings" and set "Disable all macros
1	Run macros	with notification". Re-open the Tool and choose "Enable Macros" from the "Security
		Warning" message box, which appears when you open file with macros.
		Once macros are enabled and the Tool re-opened an additional "Assessment" menu is
	"Assessment"	automatically added to your Excel ribbon. Use the "Assessment" menu to progress with
2		assessment (following the assessment steps as described in the next item) and to navigate
	menu	,
		in the Tool.
		Assessor:
		Step 1 - Review structure and fill all relevant information in sheets "General" and "FormAA0".
		· ·
		Contractor's Responsible Engineer (CRE):
		Step 2 - Contractor's Responsible Engineer (CRE) to review and sign "FormAA0". <i>Note that</i>
		no changes to "FormAA0" will be allowed after the form is signed.
		Assessor:
3	Assessment	Step 3 - Fill all relevant information on general input sheets "Deck", "Subdeck",
٥	steps	"Deck_Width", "SSI", "DK_Qual", "ES_IS_Qual" and "AssmtStatus".
		Step 4 - Add elements (Assessment menu -> Add Elements) and fill all relevant information.
		Step 5 - Add sections (Assessment menu -> Add Sections) and fill all relevant information.
		Step 6 - Run calculations for required scenario (Assessment menu -> Calculate -> Scenario).
		Note that Pre-defined Scenario is the default for a new assessment.
		Step 7 - Correct all errors in the input data (if any).
		Step 8 - Review and correct warning messages (if any).
		Step 9 - Review results.
		Checker:
		Step 10 - Steps 1 to 9 to be checked and signed by checker.
		Contractor's Responsible Engineer (CRE):
		Step 11 - Contractor's Responsible Engineer (CRE) to review assessment, write
		recommendations (sheet "CRE") and sign Form BA0 (Sheets "Form BA0(1)"). Note the Form
		BA0 cannot be signed until:
		- All scenarios are calculated using the 'Calculate All' button in the ribbon (Calculate
		Scenarios -> Calculate All)
		- The CRE either selects "Yes" in the dropdown box (cell G44) to certify that the Tracking
		Tables have been populated and checked, or selects "No" and provides justification in the
		text box as to why this is not the case.
		There are two types of input cells in the Tool - "yellow" and "tan" coloured. "Yellow" coloured
4	Input cells	cells are data value input cells and "tan" coloured cells are either data units or data source
	'	input cells.
		"Units" must be assigned to each data input (if applicable). Select units from drop down
	1	menu. Generally there are 4 options ("in", "ft", "m", "mm") except for:
5	Units	Material Strengths where the options are "N/mm^2", "MPa", "lb/in^2", "tons/in^2".
ا ا	Ullito	"Area per strand/wire" where the options are "in^2", "ft^2", "m^2", "mm^2".
	1	When "units" are assigned to a table of values, all the input data in the table must be in the
		selected units.
		"Source" must be assigned to each data input. Select information source from drop down
	1	menu - 13 options (refer to tab "General" for information sources). When "source" is
	0	assigned to a table of values and different sources are used for the input data in this table -
6	Source	specify the principal information source and use the comments facilities to record if any data
		in the table is taken from a different source. Offline supporting sources may now be included
		in the Tool.
	N	1

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No.	Topic	General note	
7	Comments	Add comments only to the data value input cells i.e. "yellow" coloured cells. These comments will be listed together with the data description in a separate sheet "Comments". All comments have to be entered using the standard Excel commenting facility.  How to add "Comment" in Excel?  1. Go to "File/Options/General" and change "User name:" to your organisation name and your initials.  2. Select the "yellow" cell to which you want to add a comment.  3. Right click and choose "Insert Comment".  How to change or delete "Comment" in Excel?  1. Select the "yellow" cell with the comment.  2. Right click and choose "Edit Comment" or "Delete Comment".  Users are encouraged to make regular use of this facility explaining their decisions.  Comments should be short, brief, clear and meaningful.	
8	Results	Comments may be added on individual element results sheets by right-clicking in the blue cells adjacent to the 'Detailed Results' table and using the Excel commenting facility (see also Item No. 7 above). These comments can then be compiled into a formatted table (as per general input comments) by selecting the "Results_Comments" sheet and selecting "Yes" when prompted by the Tool to populate the table. The user will also be prompted to update this table during printing.	
9	Printing	Note that the format of page numbering when printed is "Page 1 of N", where N is number of pages printed. Therefore one and the same page can have different page number when different printing options are used.	
10	Change of The Tool will require re-calculation when there is any change of input. Changes to		

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### **GUIDANCE NOTES**



## **Frequently Asked Questions (FAQ)**

#### 1. How to start?

Read 'Using\_tool' Item 3 which explains the steps to use the Tool.

- 2. How to add elements and sections? 'Using\_tool' Item 3' explains this.
- 3. How to sign the Form AA0 and Form BA0 using "electronic signature"? 'FormAA0', 'Form BA0(1)' & 'Form BA0(2)'. Item 'Key/Signing' explains this.
- 4. How to use the Tool to assess a bridge with more than one deck?
  A separate assessment has to be undertaken for each deck of the bridge.
- 5. How to check that the Form code and the element reference are correct? The values under 'Element Type' in column I of sheets 'Deck' and 'Subdeck' indicate what the element is, e.g. SL - reinforced concrete slab, MG - reinforced concrete beam,
- 6. An error occurs when text is added to the text box on CRE Recommendations and other sheets with text boxes.

The problem may appear because the text starts with "-". Signs like "-", "+", "=" will cause this problem if they are at the beggining of the text. Please avoid this. If you add a space in front of these signs it should work without error.

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Sheet name	Input data	Description	Suggested Sources
General	Route	e.g. Midland, Southern…	TS - Level Zero Task List
General	ELR	Engineer's Line Reference	TS - Level Zero Task List
General	Number	Bridge number. Use "_" symbol instead of "/" symbol for structures with more than one identification number (e.g. use 46_47 instead of 46/47) as bridge number is used as part of the file name and certain symbols are not permitted. Leading zeros may now be included as necessary within the bridge number (e.g. 00127).	TS - Level Zero Task List
General	Mileage	Format is "82.0022" which is 82m and 22yards.	TS - Level Zero Task List
General	OS Map Reference	Format is AA #### ####, e.g. TQ 1234 5678.	TS - Level Zero Task List
General	Bridge name	Local name.	TS - Level Zero Task List
General	Number of spans	Number input. BCMI is not applicable to footbridges although the principles are used. Refer to BCMI code NR/L3/CIV/006/2C and consider as an overbridge. Elements are numbered from left to right when looking from ES1 to ES2, where ES1 is left of low mileage.	RD - Record Drawings
General	Total number of decks	Number input. Deck is marked as DK in BCMI code. Although BCMI is not applicable to footbridges the principles are used. Refer to BCMI code NR/L3/CIV/006/2C and consider as an overbridge. Elements are numbered from left to right when looking from ES1 to ES2, where ES1 is left of low mileage.	RD - Record Drawings
General	Construction date	Input date of construction. If not known, estimate the date and add a comment.	RD - Record Drawings
General	Superstructure date	Date of superstructure construction. If not known, estimate the date and add a comment.	RD - Record Drawings
General	CARRS Parent GUID	Number input required	TS - Level Zero Task List
General	CARRS Child GUID	Number input required	TS - Level Zero Task List
General	Deck reference	Select option from drop down menu - options from "DK1" to "DK20"	
General	Obstacle crossed: Type, Name	Select from drop down menu for type.  Describe the name of the obstacle, e.g.  A321 public road.	RD - Record Drawings; AR Last Assessment Report
General	Loading requirement to NR/L3/CIV/023	Select the loading requirement of the footbridge from the dropdown. Choice of loading will affect the assessed category and utilisation factor of a section. Live load capacity is unaffected.	

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Sheet name	Input data	Description	Suggested Sources
	Source type - Last		
General	Detailed	Use the format "dd/mm/yyyy"	
General	Examination	Ose the format dd/mm/yyyy	
	report (Date)		
	Source type - Last		
Canaval	Detailed	Name of organisation that wrote the Last	
General	Examination	Detailed Examination Report	
	report (By)	· ·	
	Source type - Last		
General	Assessment	Use the format "dd/mm/yyyy"	
	Report (Date)		
	Source type - Last		
General	Assessment	Name of organisation that wrote the Last	
Contoral	Report (By)	Assessment Report.	
	Source type - Last	<del> </del>	
	Inspection for		
General	Assessment	Use the format "dd/mm/yyyy"	
	report (Date)		
	Source type - Last		
	Inspection for		
General	Assessment	Name of organisation that wrote the Last	
		Inspection for Assessment Report	
	report (By)		
	Source type -Last		
General	Visual	Use the format "dd/mm/yyyy"	
	Examination	3333	
	report -1 (Date)		
	Source type -Last		
General	Visual	Name of organisation that wrote the Last	
Corrorai	Examination	Visual Examination Report 1.	
	report -1 (By)		
	Source type -Last		
General	Visual	Use the format "dd/mm/yyyy"	
Gerierai	Examination	Ose the format dd/mm/yyyy	
	report -2 (Date)		
	Source type -Last		
General	Visual	Name of organisation that wrote the Last	
General	Examination	Visual Examination Report 2.	
	report -2 (By)	·	
	Source type -		
0	Additional	1114154-6-1-1//	
General	Examination	Use the format "dd/mm/yyyy"	
	reports (Date)		
	Source type -		
	Additional	Name of organisation that wrote the	
General	Examination	Additional Examination Reports.	
	reports (By)	Additional Examination Reports.	
	reports (by)		

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Choot name	Innut data	Description	Suggested Saurasa
Sheet name	Input data	Description	Suggested Sources
General	Source type - SCMI report (Date)	Use the format "dd/mm/yyyy"	
General	Source type - SCMI report (By)	Name of organisation that wrote the SCMI Report.	
General	Source type - Supplementary Site Inspection (Date)	Use the format "dd/mm/yyyy"	
General	Source type - Supplementary Site Inspection (By)	Name of organisation that undertook the Supplementary Site Inspection.	
General	Date of last inspection for assessment (Date)	Use the format "dd/mm/yyyy"	
General	Date of last inspection for assessment (By)	Name of organisation that undertook the inspection for assessment	
General	Source type - Record Drawings	Use the format "5E/1720/1, 3, 5-7 & 21"	
General	Source type -Five Mile Plans	Use the format "Dated"	
General	Source type - Sectional Appendices	Use the format "Dated"	
General	Source type - Level 0 Task List	Use the format "Dated"	
General	Source type - Internet	Use the format "Dated, web address"	
General	Source type - Hidden Critical Element Examination Report	Use the format "Dated, by"	
General	Offline supporting calculations & sketches (OL1-OL10) (Source Type)	Title and/or brief description of the offline supporting document to be appended to the Level 0 Assessment	
General	Offline supporting calculations & sketches (OL1-OL10) (Date)	Use the format "dd/mm/yyyy"	
General	Offline supporting calculations & sketches (OL1-OL10) (By)	Name of organisation that created the document.	

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Sheet name	Input data	Description	
FormAA0	Assessment checklist	Drop down menu - options "Yes" or "No" to the 10 questions or 13 questions where the deck comprises discrete concrete beams.	
FormAA0	Assessment checklist	Question 1: This Level 0 Assessment Tool assumes the deck is simply supported.	
FormAA0	Assessment checklist	Question 2: Only bridge spans greater than 2m and up to 30m (skew) can be assessed using this Level 0 Assessment Tool.	
FormAA0	Assessment checklist	Question 3: Only skews no greater than 20 degrees can be assessed using this Level 0 Assessment Tool unless the Assessor and CRE agree that the elements being assessed are not subjected to significant torsional effects. E.g. where simply supported discrete, narrow beams or simply supported discrete, narrow slabs are being assessed (arrangement akin to 'piano keys'), the Level 0 assessment Tool may be used for skews greater than 20 degrees. The justification to assess elements of decks with skews in excess of 20 degrees must be input.	
FormAA0	Assessment checklist	Question 4: This Tool only covers footbridges and does not allow for any vehicle loading.	
FormAA0	Assessment checklist	Question 5: This Level 0 Assessment Tool does not assess any post-tensioned elements. Where individual longitudinally spanning concrete elements are post tensioned transversely, the assessor should decide whether the elements act discretely or not (i.e. form an effective slab (go to 'Assessment Help > Elements >El_Sections).	
FormAA0	Assessment checklist	Question 6: This Level 0 Assessment Tool does not assess any composite concrete and steel elements.	
FormAA0	Assessment checklist	Question 7: This Level 0 Assessment Tool assumes the deck and its elements are all simply supported and statically determinate.	
FormAA0	Assessment checklist	Question 8: This Level 0 Assessment Tool assumes the deck elements are all simply supported. Slabs acting in hogging are not assessed (e.g. overhanging the edge girder) and should be included as an additional sdl load on the main girder.	
FormAA0	Assessment checklist	Question 9: This Tool will undertake a Level 0 assessment of a deck formed of discrete longitudinal spanning reinforced concrete beams (form code DIM-F) and longitudinal spanning reinforced concrete beams with a transverse reinforced concrete slab spanning between them (form codes DHF and DQ-EF). If these forms are being assessed, answering "Yes" to Q10 invokes Q11 through Q13.  Where longitudinal spanning elements are connected together transversely to form an effective slab, the assessor shall answer "No".	
FormAA0	Assessment checklist	Question 10 (not available if the answer to Question 9 is "No"): This Level 0 Assessment Tool limits the number of main beams per deck to 5. If the deck has more than 5 main beams, the assessor shall select the appropriate part of the deck to assess and record the decision in the	

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Sheet name	Input data	Description	
FormAA0	Structural form code	Form code consists of 5 letters/numbers (Ref1-Ref5) representing; Bridge Type (Ref1), Primary Longitudinal Elements (Ref2), No. of Primary Elements (Ref3), Floor Types (Ref4), Track/Road Form (Ref5). Drop down menus with valid combinations for the form codes included in the Tool are provided. The assessor must choose the form code combination that defines the bridge deck correctly and completely.	
FormAA0	Assessment checklist	Question 11 (or Question 10, if the answer to Question 9 is "No"): This Level 0 Assessment Tool considers only those structures that can be defined from the form code options given.	
FormAA0	Enter correct form code	This field will become available if the answer to Question 11 is "No". Provide the correct form code for the structure if the bridge deck is not correctly and completely defined using the available form code options. The correct form code is selected using the form code builder which allows access to all available form codes.	
FormAA0	Justification for adopting Level 0 assessment (if required)	If the answers to the questions in the Assessment Checklist result in the following statement appearing: "Bridge deck is NOT suitable for Level 0 assessment.", this Level 0 Assessment Tool is not wholly appropriate to assess the deck. However, a deck should not be excluded from level 0 assessment based on this alone. The assessing organisation should use their experience and engineering judgement to populate as many primary elements as possible in this Assessment Tool and record the justification in this box.	
FormAA0	Name/Signing Form AA0	Name of the CRE from the Assessing organisation.	
FormAA0	Title/Signing Form AA0	Title of the CRE from the Assessing organisation. To be filled by the CRE.	
FormAA0	Signing Form AA0	The Form AA0 should only signed by the CRE. After filling in the Name and Title, go to Assessment menu and select "Sign Forms". It is the responsibility of the Assessor to ensure each form is signed by a competent and approved person. The signatures will be checked and approved by Network Rail Structures Managers. Completing the signing procedure will lock all the information in Form AA0 sheet.	

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		VOICION I BO ON
Sheet name	Input data	Description
Onoot name	mpar auta	The form code in the Tool is to be
		populated using the drop down list. This
		may be different than what is in the
		spreadsheet provided by Network Rail
		separately. Network Rail will capture the
		form code from the Tool which will form
	Other sets and the man	the definitive list.
FormAA0	Structural form	Bridge Type (Ref1)
	code - Ref1	D:- Deck
	0, , ,	Primary Longitudinal Elements (Ref2)
FormAA0	Structural form	I :- Reinforced concrete slab
	code - Ref2	H :- Reinforced concrete beams
		Q :- Pre-tensioned beams
		No. of Primary Elements (Ref3)
		1 :- Single element
	Structural form	M :- Multiple elements
FormAA0	code - Ref3	- :- Not applicable EXCEPT where DH
	oode reio	selected and '-' refers to a monolithic
		beam and transverse spanning rc slab
		arrangement
	Structural form	Floor Types (Ref4)
FormAA0	code - Ref4	- :- Not applicable for concrete
	code - IXeI4	underbridges.
FormAA0	Structural form	Track/Road Form (Ref5)
FOITIAAU	code - Ref5	F - Foot only
	Structural form	The allowable combinations of the above
FormAA0	code	five codes can be found within the Tool.
	-	The seaso sail so to and main the Tooli
FormAA0	Structural Form	4
	Code - Example	
		DHM-F (RC beams arranged as discrete elements)
Γο wee Δ Δ Ο	Structural Form	
FormAA0	Code - Example	
	·	
		DHM-F (RC beams arranged to form a single slab)
	Structural Form	
FormAA0	Code - Example	
	Code - Example	
	-	Diti-r (aingle Ko siab)
	Christian I Francis	
FormAA0	Structural Form	
	Code - Example	
		DU E (DC hooms incl. floored hooms with transverse enemis = DC de-1)
		DHF (RC beams incl. flanged beams with transverse spanning RC deck)

Sheet Name: GN\_FormCode 15 of 44





Sheet name	Input data	Description
FormAA0	Structural Form Code - Example	DQF (Pre-tensioned beams arranged as discrete elements)
FormAA0	Structural Form Code - Example	DQF (Pre-tensioned beams arranged to form a single slab)

Sheet Name: GN\_FormCode 16 of 44





Sheet name	Input data	Description	Suggested Sources
Deck	Span number	Number is required.	
Deck	Supports 1st	Label it as per BCMI code NR/L3/CIV/006/2C, i.e. ES1, IS1, etc. and consider as an overbridge. ES1 is left of low mileage when facing high mileage.	
Deck	Supports 2nd	Label it as per BCMI code NR/L3/CIV/006/2C, i.e. ES1, IS1, etc. and consider as an overbridge. ES1 is left of low mileage.	
Deck	Min vertical clearance to soffit:	Number in units selected.	DE - Last Detailed Examination report; Internet
Deck	Skew:	the Tool assumes a torsionless system and as such the skew angle is limited to a max +/- 20 degrees unless justified otherwise. Skew effects are not considered in this Level 0 Assessment Tool and all decks are considered square.	RD - Record Drawings; AR - Last Assessment Report
Deck	Minor elements (individually marked)	Refer to BCMI code NR/L3/CIV/006/2C and Abbreviation list part of this Guidance Note. Although BCMI is not applicable to footbridges, the principles of the system are used.	
Deck	Applicable	Select "Yes" from the drop down list if the minor elements exist in the deck being assessed. Otherwise select "No". The assessor must fill this column in full.	
Deck	Name in RD (AR)	Label/name of the element used in VERA/RD/AR for reference code.	RD - Record Drawings; AR - Last Assessment Report
Deck	Correct BCMI Code	If the element is not correctly defined using the code field, enter the correct reference.	
Deck	Correct BCMI No	If the element is not correctly defined using the code field, enter the correct reference.	
Deck	Assmt Calcs	Select whether assessment calculations are required for the elements listed using the drop down menu - options "Yes" or "No". Note that only elements that have been identified as applicable for the structure can be selected.  Only elements with different cross section, condition, loading or length should be chosen for "Assmt Calcs".  When two (or more) elements are the same only one can be chosen for calculations and commenting facilities used to record why other elements have not been calculated. (e.g. Element same as)	

Sheet Name: GN\_Deck 17 of 44





Sheet name	Input data	Description	Suggested Sources
		This sheet is applicable only for the Level	
		0 assessment of form codes DHF and	
Subdeck		DQ-EF, i.e. a deck formed of longitudinal	
Subueck		spanning beams with a transverse	
		reinforced concrete slab spanning	
		between them.	
		Up to 4 sub decks may be included with	
Subdeck		DCK (i.e. a transverse spanning	
Subueck		reinforced concrete slab) the default	
		assessment option within a sub-deck.	
		DCK1 refers to all DCKs in subdeck	
Subdeck		number 1. Refer to BCMI code	
		NR/L3/CIV/006/2C.	
Subdeck	No	Select subdeck number from drop down	
Subueck	INO	menu - 5 options (1 to 5).	
		Select reference (index) number from	
		drop down menu - options from "(0)" to	
		"(9)".	
		To allow for the elements to be	
		individually marked, an extra index (i) will	
		be added e.g. DCK1(1), DCK5(2) etc.	
		An index (0) can be used to mark these	
		elements as a group e.g. DCK1(0) and	
		will have the same meaning as in the	
		current BCMI code.	
		If the assessed element can represent all	
Subdeck	(Index)	transverse spanning slabs in sub-deck	
	,	number 1, the assessment results will be	
		presented for DCK1(0).	
		If there is a issue with inner transverse	
		spanning slab number 2 (i.e. where deck	
		has discrete transverse spanning slabs)	
		in sub-deck number 1, then results will be	
		presented for DCK1(2).	
		The additional index (i) numbering will	
		follow the same convention as for all	
		minor elements in a deck i.e. low to high	
		mileage and left to right when facing high	

Sheet Name: GN\_Subdeck 18 of 44





Sheet name	Input data	Description	Suggested Sources
Subdeck	Name in RD (AR)	Label/name of the element used in VERA/RD/AR for reference.	RD - Record Drawings; AR - Last Assessment Report
Subdeck	Correct BCMI Code	If the element is not correctly defined using the code field, enter the correct reference.	
Subdeck	Correct BCMI No	If the element is not correctly defined using the code field, enter the correct reference.	
Subdeck	Assmt Calcs	Specify which minor elements will be assessed by selecting "Yes" or "No" from the drop down menu. Note that only elements that have been identified by filling the subdeck and index references can be selected.  Only elements with different cross section, condition, loading or length should be chosen for "Assmt Calcs".  When two (or more) elements are the same only one can be chosen for calculations and commenting facilities used to record why other elements have not been calculated. (e.g. Element same as)	
Subdeck	Source	Select information source from drop down menu - 13 options (refer to tab "General" for information sources)	

Sheet Name: GN\_Subdeck 19 of 44





	1		
Sheet name	Input data	Description	Suggested Sources
Deck_Width	Units	Select units from drop down menu - 4 options ("in", "ft", "m", "mm")	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Deck_Width	Source	Select information source from drop down menu - 13 options (refer to tab "General" for information sources)	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Deck_Width	Deck and sub- decks width, Distances	These are the distances between the main longitudinal elements starting from the set datum. Datum is at the external face of the left most longitudinal deck element when looking along the bridge from ES1 to ES2, with ES1 left of low mileage, i.e. MGE1. In case of a single reinforced concrete slab deck, the distance to the middle of the deck width must be entered as value for MGI1. Enter distances as shown on the sketch i.e. distances between adjacent elements.  Where the width of single reinforced concrete slab is greater than three times the width of the applied live load (i.e. the sleeper length), the assessor should reduce the slab width input accordingly.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report

Sheet Name: GN\_Deck\_Width 20 of 44





Sheet name	Input data	Description	Suggested Sources
SSI		Free text space provided for recording the findings of supplementary site inspection (SSI).	

Sheet Name: GN\_SSI 21 of 44





Sheet name	Input data	Description	Suggested Sources
		For elements where a qualitative check is appropriate, the Tool has been designed so that the assessing engineer can record	
DK_Qual		the judgement on whether the structure is adequate or not (as opposed to automating it based on the defect details input).  Defects are noted using a drop down list	
		to show the basis of the judgement.	
DK_Qual		Elements are grouped together by similar type. For example all bearings are included in one table with one list of standard defects. So a noted crack could apply to any bearing. Greater details can be included, where necessary, by using the commenting facility.	
DK_Qual	Material	Select element material from drop down menu - 11 options ("Masonry", "Concrete", "Steel", "Wrought Iron", "Cast Iron", "Timber, Elastomeric", "Felt", "Other", "Unknown", "N/A").	DE - Last Detailed Examination report; IR - Last Inspection for Assessment report
DK_Qual	Defects	Record whether any defects have been identified. Select from drop down menu - 4 options ("Yes", "No", "Unknown", "N/A"). These affect the recommendation for further action.	DE - Last Detailed Examination report; IR - Last Inspection for Assessment report
DK_Qual	Source	Select information source from drop down menu - 13 options (refer to tab "General" for information sources)	
DK_Qual	Qualitative assessment result	Record the qualitative assessment result from drop down menu - 3 options ("Adequate", "Inadequate", "Indeterminate"). Indeterminate should be selected when it has not been possible to determine the adequacy from the information available.	

Sheet Name: GN\_DK\_Qual 22 of 44





For elements where a qualitative check is appropriate, the Tool has been designed so that the assessing engineer can record the judgement on whether the structure is adequate or not (as opposed to automating it based on the defect details input).  Defects are noted using a drop down list to show the basis of the judgement.  Elements are grouped together by similar type. For example all abutments and wing walls are included on one table with one list of standard defects. So a noted crack could apply to either abutment or any wing walls. Further details can be included, where necessary, by using the	
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list of standard defects. So a noted crack could apply to either abutment or any wing walls. Further details can be	
ES_IS_Qual could apply to either abutment or any wing walls. Further details can be	
wing walls. Further details can be	
lincluded, where necessary, by using the l	
commenting facility.	
Select element material from drop down	
	Inspection for
ES_IS_Qual Material "Concrete", "Steel", "Wrought Iron", "Cast Assessme	
	Examination report
"Other", "N/A", "Unknown").	
Record whether any defects have been	
	Inspection for
ES_IS_Qual Defects 4 options ("Yes", "No", "Unknown", "N/A"). Assessme	
	Examination report
further action.	
Select information source from drop down	
ES_IS_Qual Source menu - 13 options (refer to tab "General"	
for information sources)  Record the qualitative assessment result	
from drop down menu - 3 options	
("Adequate", "Inadequate",	
Qualitative   (Adequate , Inadequate ,	
I = - Igeegeement recult I	
selected when it has not been possible to determine the adequacy from the	
information available.	
Qualitative Result	
Les is Qual based on Minor   Choose the minor element that the	
element qualitative result is based on.	

Sheet Name: GN\_ES\_IS\_Qual 23 of 44





Sheet name	Input data	Description	Suggested Sources
		Predefined live loads are pedestrian load	
		(3, 4 or 5kN/m^2 depending on	
LL-Predef		Footbridge Category A-C selected on the	
		General tab) and nominal point load	
		(1.5kN) for assessing transverse	
		elements. There are no cells for input.	

Sheet Name: GN\_LL-Predef 24 of 44





Sheet name	Input data	Description	Suggested Sources
AssmtStatus	Assessment status	Select status of this assessment from the drop down menu - 3 options (Provisional, Updated, Revalidated). The assessment status will automatically be changed to Final once the Form BA0(1) is signed by the CRE.	
AssmtStatus	Outstanding actions - Review of record drawings	Select from drop down menu - options "Yes", "No" or "N/A".	
AssmtStatus	Outstanding actions - Site measurement of key/missing dimensions	Select from drop down menu - options "Yes", "No" or "N/A". CRE is responsible for the review of the comments inserted for outstanding actions and making recommendations regarding site attendance to confirm/collect data.	
AssmtStatus	Outstanding actions - Confirmation of current condition	Select from drop down menu - options "Yes", "No" or "N/A".	
AssmtStatus	Outstanding actions - Other	Select from drop down menu - options "Yes", "No" or "N/A". If "Yes" insert a comment.	
AssmtStatus	Reason/basis for update	Select from drop down menu - options "Bridge bash damage" or "Other".	
AssmtStatus	Reason/basis for revalidation	Select from drop down menu - 4 options (Reconfirmed at next DE, Review of current condition, Review of current use, Other). If "Other" insert a comment.	

Sheet Name: GN\_AssmtStatus 25 of 44





Sheet name	Input data	Description	Suggested Sources
CRE		Contractor's responsible Engineer's (CRE) recommendations to be written here.	

Sheet Name: GN\_CRE 26 of 44





Sheet name	Input data	Description	Suggested Sources
Form BA0(1)		First part of the Certificate	
		Input the address of the Company	
Form BA0(1)	Address	responsible for the assessment in Royal	
		Mail standard format.	
E DAO(4)	Name/Signing	Name of the CRE from the Assessing	
Form BA0(1)	Form BA0	organisation.	
D A O (4)	Title/Signing Form	Title of the CRE from the Assessing	
Form BA0(1)	BA0	organisation. To be filled by the CRE.	
		The Form BA0(1) should only be signed	
		by the CRE. After filling in the Name and	
		Title, the CRE must either verify that the	
		Tracking Tables have been populated	
		and checked by selecting "Yes" from the	
		provided dropdown box, or otherwise	
		select "No" but provide justification as to	
		why this has not been carried out. The	
		1 -	
		CRE may then go to the Assessment tab	
		and select "Sign Forms" to complete	
		Form BA0 sign-off. It is the responsibility	
		of the Assessor to ensure each form is	
		signed by a competent and approved	
		person. The signatures will be checked	
		and approved by Network Rail Structures	
Form BA0(1)	Signing Form BA0	Managers. Completing the signing	
I OIIII BAO(1)	Signing Form BAO	procedure will lock all the information in	
		Form BA0(1) sheet.	
		Before signing the Form BA0(1) form the	
		inputs will be checked to ensure no	
		changes have been made since the	
		calculation was run. If changes have been	
		made, the calculation must be re-run	
		before signing the forms. The Form	
		BA0(1) cannot be signed unless Tracking	
		Table status has been verified (with either	
		a 'Yes' response, or a 'No' response with	
		accompanying justification) and all	
		scenarios have been calculated using the	
		'Calculate Scenarios' > 'Calculate All'	
		button. This is even the case if only	
		Scenario 1 (predefined) is being used.	

Sheet Name: GN\_Form BA0(1) 27 of 44





Sheet name	Input data	Description	Suggested Sources
Form BA0(2)		Second part of the Certificate	
Form BA0(2)	Name/Signing Form BA0	Name of the Structure Manager, Network Rail.	
Form BA0(2)	Title/Signing Form BA0	Title of the Structure Manager, Network Rail. To be filled by the Structure Manager.	
Form BA0(2)	Signing Form BA0	The Form BA0(2) should only be signed by the Structure Manager. After filling in the Name and Title, go to Assessment menu and select "Sign Forms".  Completing the signing procedure will lock the relevant information in Form BA0(2) sheet (i.e. "Structures Manager's comments on assessment") and change the Assessment Status to "Final".  Before signing the Form BA0(2) form the inputs will be checked to ensure no changes have been made since the calculation was run. If changes have been made, the calculation must be re-run before signing the forms.  On signing, two XML files will be created which are used for adding assessment information to the Level 0 database and CSAMS database respectively.	

Sheet Name: GN\_Form BA0(2) 28 of 44





Sheet name	Input data	Description	Suggested Sources
EI_Loads	p.u. data	Loading must be specified per element. Dead loads are calculated automatically based on midspan section properties for each element.  Slabs acting in hogging and not assessed (e.g. overhanging the edge girder) should be included as an additional sdl load relevant to the element being assessed. There are 3 options to specify "Other SDLs": The assessor may input depth and material; or depth and unit weight; or calculated loading.  If the applicable partial factor on the "Other SDLs" is not gfL=1.2, the appropriate factor for the loading should be input as the appropriate gfL / 1.2.	
El_Loads	Loaded width (Pedestrian Load) of Element	The width of loading to be applied to the element should be input. For main girders this is typically the proportion of floor load acting on the girder. For cross girders this is typically the cross girder spacing. Live load is applied individually to each element and is not automatically transferred between elements.	
El_Loads	Units	Select units from drop down menu - 4 options ("in", "ft", "m", "mm")	
El_Loads	Source	Select information source from drop down menu - 13 options (refer to tab "General" for information sources)	
El_Loads	SDLs: General comment	Additional SDLs may be input or calculated in the Tool. They are classified as either "Area loads" (e.g. waterproofing) or "Line loads" (e.g. parapets) when the deck plan is considered.	
El_Loads	SDLs: Name	Add name of another SDL if different than the SDLs pre-defined. All input units to be kN and m.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
EI_Loads	SDLs: Area loads: Depth	The assessor may input the depth (or thickness) of the SDL (e.g. waterproofing thickness) and the Tool will use this input to calculate the load to apply. Input must be in metres. (Refer to general comment for this Tab).	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
El_Loads	SDLs: Area loads: Width	This is the loading width per element for the specified area loading. It is usually equal to the elements' spacing (i.e. the spacing between main beams or slabs) which is usually the section width (B) input for the section properties.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report

Sheet Name: GN\_EI\_Loads 29 of 44





	1		
Sheet name	Input data	Description	Suggested Sources
EI_Loads	SDLs: Line loads: Area	The assessor may input the area of the element and the Tool will calculate the line load to apply (e.g. sectional area of a parapet). Input must be in square metres. (Refer to general comment for this Tab). A factor gfL = 1.2 is applied to these loadings in the calculation.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
El_Loads	SDLs: Material	Select the element material from the drop down menu. The menu includes all the options for materials in NR/GN/CIV/025-3, table 4.2 and will use the unit weight therein in calculating the SDL to apply to the element as a udl. If not applicable, leave blank and input the unit weight.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
El_Loads	SDLs: Unit Weight	The assessor may input the Unit Weight (always in kg/m^3) and the Tool will use the unit weight input in calculating the SDL to apply to the element as a udl. the Tool will return an "error" if a Material is selected AND Unit Weight input.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
El_Loads	SDLs: Loading	calculation. the Tool will return an "error"	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report

Sheet Name: GN\_EI\_Loads 30 of 44





Sheet name	Input data	Description	Suggested Sources
El Sections	Units (except	Select units from drop down menu - 4	
EI_Sections	Strength)	options ("in", "ft", "m", "mm")	
		Select information source from drop down	
EI_Sections	Source	menu - 13 options (refer to tab "General"	
		for information sources)	
		Refer to NR/GN/CIV/025 and sketch in the tab. Generally this is the distance	RD - Record Drawings; AR -
EI_Sections	Effective span	between supports of the deck (slab or	Last Assessment Report; IR -
		beams). Insert a comment how the	Last Inspection for Assessment
		effective span is calculated.	report
EI_Sections	Overall length	Overall length of the deck (slab or beams).	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
			RD - Record Drawings; AR -
EI_Sections	Loaded length	The length over which the live load is	Last Assessment Report; IR -
LI_Sections	Loaded leligili	applied.	Last Inspection for Assessment
			report
		Select cross section type from drop down menu. The options available depend on the form code selected: "RC Slab", "RC Beam (Rectangular Discrete)", "RC Beam (Rectangular)", "Pre-tensioned Beam (Rectangular)" and "Pre-tensioned Beam (Rectangular Discrete)".	
EI_Sections	Cross section type	Where multiple longitudinal spanning elements support the railway but are not connected together transversely, select the (Discrete) option. Note that this Tool assesses rectangular reinforced concrete sections, flanged reinforced concrete sections (only for form code DHF: select "RC Flanged Beam") and rectangular pretensioned sections.	
		Reinforced concrete slab sections and reinforced concrete beam sections are interchangeable in the Tool. The only difference is when inputting section properties, the flexural reinforcement for a slab is input as the bar diameter and spacing, whereas the reinforcement for a beam is input as the bar diameter and the total number of bars in the section defined.	
EI_Sections	Material strength type: Concrete	Select material strength type for from drop down menu - 2 options ("Concrete (Characteristic)" and "Concrete (Worst Credible"). Refer to Clauses 7.2.2.1 and 7.2.2.2 in NR/GN/CIV/025 for more information.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report

Sheet Name: GN\_EI\_Sections 31 of 44





Sheet name	Input data	Description	Suggested Sources
EI_Sections	Material strength type: Reinforcement	Select material strength type for from drop down menu - 3 options ("Reinforcing Bars (Characteristic)", "Reinforcing Bars (Worst Credible") and "N/A"). Refer to Clauses 7.2.2.1 and 7.2.2.2 in NR/GN/CIV/025 for more information. Select "N/A" if no reinforced concrete elements are being assessed.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
EI_Sections	Material strength type: Tendons	Select material strength type for from drop down menu - 3 options ("Tendons (Characteristic)", "Tendons (Worst Credible") and "N/A"). Refer to Clauses 7.2.2.1 and 7.2.2.2 in NR/GN/CIV/025 for more information. Select "N/A" if no pretensioned concrete elements are being assessed.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
EI_Sections	Concrete Strength	Input the cube strength of the concrete. Refer to Appendix B1 of NR/GN/CIV/025 for historical concrete grade details.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
EI_Sections	Tendon Strength	Input the strength of the prestressing tendons. Leave blank if there are no pretensioned concrete elements being assessed.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
EI_Sections	Tendon initial stress, i.e. at T=0	Input the initial stress applied to the prestressing tendons, i.e. the stress applied when the element was constructed, T = 0. Note that losses are considered elsewhere in the Tool. Leave blank if there are no pre-tensioned concrete elements being assessed. Note that the initial stress should be input for the effective tendons only, i.e. debonding and curtailment must be considered.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
EI_Sections	Reinforcing Bars Strength (Flexural)	Input the strength of the main reinforcing bars (i.e. the reinforcement primarily resisting flexure). Input "0" (zero) if there are no reinforcing bars in the section being assessed.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
EI_Sections	Reinforcing Bars Strength (Shear)	Input the strength of the shear reinforcing bars (i.e. the reinforcement primarily resisting shear, e.g. links). Input "0" (zero) if there are no shear reinforcing bars in the section being assessed.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
EI_Sections	Strength: Units	Select material strength unit from drop down menu - 4 options("N/mm^2", "MPa", "lb/in^2", tons/in^2).	

Sheet Name: GN\_EI\_Sections 32 of 44





Sheet name	Input data	Description	Suggested Sources
		This is automatically calculated based on	
El_Sections	Elastic Modulus	NR/GN/CIV/025 clause 4.3.2B. Units are	NR/GN/CIV/025 clause 4.3.2B
		kN/mm^2.	
		Select the relevant position along the	
		element from the drop down menu - 5	
		options:	
		"Ed" :- end of element, shear assessed	
		(full shear enhancement),	
		"Md" :- middle of element, shear and	
		bending assessed,	
		"CR" :- reinforcement curtailment point	
		or tendon debonding point, shear and	
		bending assessed,	
		"VE" :- location along element from the	
		support where shear enhancement is no	
		longer applicable, shear and bending	
		assessed,	RD - Record Drawings; AR -
		"DS" :- damaged or deteriorated section,	Last Assessment Report; IR -
EI_Sections	Code	shear and bending assessed,	Last Inspection for Assessme
		These references are used to identify the	report
		positions where the elements are	
		assessed in determining the "section	
		reference".	
		"AD" :- assessor defined section. Any	
		point along the beam at which the	
		assessor deems necessary to assess.	
		These references are used to identify the	
		positions where the elements are	
		assessed in determining the "section	
		reference".	
		Telefolioc :	
l		All sections should be entered with no	
		empty rows between sections.	
		Select a reference number from the drop	
EI_Sections	No.	down menu - options from "1" to "9". Used	
		for "section reference".	
		No manual input required: The section	
		reference has been determined from the	
		previous input. Consider the following	
		example: For the external beam number 2	
El_Sections	Section Reference	the full reference of the 2 default	
		assessment check section references will	
		be:	
1		MGE2-Ed1 at "d" m,	
		MGE2-Md1 at midspan.	

Sheet Name: GN\_EI\_Sections 33 of 44





			Version i bc 3.1
Sheet name	Input data	Description	Suggested Sources
EI_Sections	Distance	Input the distance from the start point of the element. Sections along the element are identified according to this distance. Note that start point of the element is defined as the beginning of the effective span. For all longitudinal elements the start point is at the low mileage end and for all transverse members at the left end when facing high mileage. The assessor must decide at what distance to assess the section where reinforcement is curtailed or tendons debonded.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
EI_Sections	Distance	The Tool has 2 default assessment check sections, at a distance d from the first support and at midspan. Note that these sections may not be the critical sections: The assessor must add the critical sections which may be between d and 3d for shear (consider also whether shear enhancement is applicable). In particular, the assessor must add the critical sections for bending and shear when assessing subdecks (DCK for DHF) as the loading may not be symmetrical, i.e. the maximum bending may not be at midspan and the maximum shear may be adjacent to support 2.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
EI_Sections	Condition	Select appropriate condition description from the dropdown, choose from "As-built Condition", "Current Condition" and "Section with Defect".  As-built Condition: The section has been taken as-built taking no account of deterioration.  Current Condition: The section has been taken at a location of general deterioration.  Section with Defect: The section has been taken at the location of a specific defect.	DE - Last Detailed Examination report; IR - Last Inspection for Assessment report; BCMI - BCMI report
EI_Sections	Defect ID	If the condition of a section is chosen to be "Section with Defect", a Defect ID should be provided.	Detailed examination report

Sheet Name: GN\_EI\_Sections 34 of 44





			Version FBC 3.1
Sheet name	Input data	Description	Suggested Sources
		This sheet may be used to input the section properties for a rectangular, reinforced concrete beam or slab. The bending reinforcement input in this sheet is the bar diameter and bar spacing.	
Sec_RCS_Slab	Source	Select information source from drop down menu - 13 options (refer to tab "General" for information sources)	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCS_Slab	Units	Select units from drop down menu - 4 options ("in", "ft", "m", "mm")	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCS_Slab	Depth	Vertical dimension. See the sketch provided.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCS_Slab	Breadth	Horizontal dimension. See the sketch provided. All slab sections considered in the Tool are rectangular and symmetrical about y-y axis. Generally the 'Breadth' input should equal the full width of the slab being assessed.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCS_Slab	Cover to outermost bar: Top	Distance from concrete top face to the top reinforcing bars. If there are no top reinforcing bars, input "0" (zero).	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCS_Slab	Cover to outermost bar: Bottom	Distance from concrete bottom face to the bottom reinforcing bars. If there are no bottom reinforcing bars, input "0" (zero).	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCS_Slab	Layer spacing	Clear distance between the bottom layer of reinforcement and the layer above. If there is only one layer of reinforcement, input "0" (zero).	RD - Record Drawings; AR - Last Assessment Report
Sec_RCS_Slab	Spacing	Distance between the reinforcing bar centres. Input "0" (zero) if there is no reinforcement in that layer or section.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCS_Slab	Diameter	Diameter of the effectively anchored reinforcing bars. Input "0" (zero) if there is no reinforcement in that layer or section.  Note that the effective bar diameters may be input where bars in the section considered are not fully anchored, e.g. if the section being assessed is at a distance less than the anchorage required for a particular bar, the bar may be considered effective but its diameter reduced. Include calculation and justification as a comment.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report

Sheet Name: GN\_Sec\_RCS\_Slab 35 of 44





Sheet name	Input data	Description	Suggested Sources
Sheet name	input data	Description	Suggested Sources
Sec_RCS_Slab	Corrosion Loss	The loss of bar sectional area due to corrosion, input as a percentage of the original bar sectional area. Maximum corrosion loss applicable for use in this Tool is 30%. Refer to NR/GN/CIV/025 clause 7.2.3. Input "0" (zero) if no section loss is to be considered or is there is no reinforcement in that particular layer.	AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCS_Slab	Are bars effectively anchored?	Only effectively anchored flexural steel may be considered in calculating shear enhancement. The assessor can select "Yes" or "No" from the drop down list. If "No" is selected, the shear reinforcement will be considered ineffective and no shear enhancement will be permitted.	RD - Record Drawings; AR - Last Assessment Report
Sec_RCS_Slab	No. of shear legs	The number of effectively anchored shear legs the transverse section (i.e. within the breadth, "b"). The shear legs may be vertical or bent up. (Note that inclined links must be input as bent up bars). See the sketch provided. A numerical value must be entered. Input "0" (zero) if there are no shear legs. Note that the assessor must only consider and input properties of the bent up bars or inclined links where they comply with the recommendations in BA 44 cl. 5.3.3.2.	AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCS_Slab	Angle (30° < α ≤ 45°)	The angle between the bent up bars (where they exist) and the horizontal. See the sketch provided. Where the angle exceeds 45° the assessor should refer to BA 44/96 cl. 5.3.3.2.	RD - Record Drawings; AR - Last Assessment Report

Sheet Name: GN\_Sec\_RCS\_Slab 36 of 44





			version FBC 3.1
Sheet name	Input data	Description	Suggested Sources
Sheet name	input data	This sheet may be used to input the section properties for a rectangular, reinforced concrete slab or beam. The bending reinforcement input in this sheet is the bar diameter and number of bars.	Suggested Sources
Sec_RCB_Beam	Source	Select information source from drop down menu - 13 options (refer to tab "General" for information sources)	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCB_Beam	Units	Select units from drop down menu - 4 options ("in", "ft", "m", "mm")	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCB_Beam	Depth	Vertical dimension. See the sketch provided.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCB_Beam	Breadth	Horizontal dimension. See the sketch provided. All beam or slab sections considered in the Tool are rectangular and symmetrical about y-y axis. Generally the 'Breadth' input should equal the 'Loading width' for discrete beams and slabs.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCB_Beam	Cover to outermost bar: Top	Distance from concrete top face to the top reinforcing bars. If there are no top reinforcing bars, input "0" (zero).	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCB_Beam	Cover to outermost bar: Bottom	Distance from concrete bottom face to the bottom reinforcing bars. If there are no bottom reinforcing bars, input "0" (zero).	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCB_Beam	Cover to outermost bar: Side	Distance from concrete side faces to the shear reinforcing bars (links). If there are no shear reinforcing bars, input "0" (zero).	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCB_Beam	Layer spacing	Clear distance between the bottom layer of reinforcement and the layer above. If there is only one layer of reinforcement, input "0" (zero).	RD - Record Drawings; AR - Last Assessment Report
Sec_RCB_Beam	Diameter	Diameter of the reinforcing bars. Input "0" (zero) if there is no reinforcement in that layer or section.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report

Sheet Name: GN\_Sec\_RCB\_Beam 37 of 44





Sheet name	Input data	Description	Suggested Sources
Sec_RCB_Beam	No. of bars	The number of effectively anchored reinforcement bars in the section (i.e. within the breadth, "b"). A numerical value must be entered. Input "0" (zero) if there are no reinforcing bars in the section.  Note that the number of effective bars should be calculated at the section being assessed, taking into account whether they are fully anchored or not, e.g. if the section being assessed is at a distance less than the anchorage required for a particular bar, a percentage of the bar may be considered effective and included. Include calculation and justification as a comment.	RD - Record Drawings; AR - Last Assessment Report
Sec_RCB_Beam	Corrosion Loss	The loss of bar sectional area due to corrosion, input as a percentage of the original bar sectional area. Maximum corrosion loss applicable for use in this Tool is 30%. Refer to NR/GN/CIV/025 clause 7.2.3. Input "0" (zero) if no section loss is to be considered.	AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCB_Beam	Are bars effectively anchored?	Only effectively anchored flexural steel may be considered in calculating shear enhancement. The assessor can select "Yes" or "No" from the drop down list. If "No" is selected, the shear reinforcement will be considered ineffective and no shear enhancement will be permitted.	RD - Record Drawings; AR - Last Assessment Report
Sec_RCB_Beam	No. of shear legs	The number of effectively anchored shear legs the transverse section (i.e. within the breadth, "b"). The shear legs may be vertical or bent up. (Note that inclined links must be input as bent up bars). See the sketch provided. A numerical value must be entered. Input "0" (zero) if there are no shear legs. Note that the assessor must only consider and input properties of the bent up bars or inclined links where they comply with the recommendations in BA 44 cl. 5.3.3.2.	AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCB_Beam	Spacing	Distance between the reinforcing bar centres. Input "0" (zero) if there are no links (vertical) or bent up bars.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCB_Beam	Angle (30° < α ≤ 45°)	The angle between the bent up bars (where they exist) and the horizontal. See the sketch provided. Where the angle exceeds 45° the assessor should refer to BA 44/96 cl. 5.3.3.2.	RD - Record Drawings; AR - Last Assessment Report





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Sheet name	Input data	Description	Suggested Sources
		This sheet may be used to input the section properties for a reinforced concrete flanged or tee beam, formed from a rectangular beam plus a width of transverse slab. All flanged or tee beams are considered symmetrical about the y-y axis.	
Sec_RCF_Beam	Source	Select information source from drop down menu - 13 options (refer to tab "General" for information sources)	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCF_Beam	Units	Select units from drop down menu - 4 options ("in", "ft", "m", "mm")	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCF_Beam	Beam depth	or tee beam. See the sketch provided.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCF_Beam	Flange breadth	Horizontal dimension of the width of slab forming the flanged or tee beam. See the sketch provided. Generally the 'Flange Breadth' input should equal the 'Loading width' for flanged beams. The assessor must take care inputting the width of the flange to avoid applying excessive dead load (flange breadth of adjacent sections overlap) or miss dead load (flange breadth of adjacent section does not account for the full width of the slab forming the flanged or tee beam).	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCF_Beam	Flange thickness	Vertical dimension of the slab forming the flanged or tee beam. See the sketch provided.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCF_Beam	Web breadth	Horizontal dimension of the beam section forming the flanged or tee beam. See the sketch provided.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCF_Beam	Cover to outermost bar: Top	Distance from concrete top face to the top reinforcing bars. If there are no top reinforcing bars, input "0" (zero).	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCF_Beam	Cover to outermost bar: Bottom	Distance from concrete bottom face to the bottom reinforcing bars. If there are no bottom reinforcing bars, input "0" (zero).	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCF_Beam	Cover to outermost bar: Side	Distance from concrete side faces to the shear reinforcing bars (links). If there are no shear reinforcing bars, input "0" (zero).	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report

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Sheet name	Input data	Description	Suggested Sources
Sec_RCF_Beam	Layer spacing	Clear distance between the bottom layer of reinforcement and the layer above in the beam section. If there is only one layer of reinforcement, input "0" (zero).	RD - Record Drawings; AR - Last Assessment Report
Sec_RCF_Beam	Diameter	Diameter of the reinforcing bars. Input "0" (zero) if there is no reinforcement in that layer or section.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCF_Beam	No. of bars	The number of effectively anchored reinforcement bars in the section (i.e. within the breadth, "b"). A numerical value must be entered. Input "0" (zero) if there are no reinforcing bars in the section.  Note that the number of effective bars should be calculated at the section being assessed, taking into account whether they are fully anchored or not, e.g. if the section being assessed is at a distance less than the anchorage required for a particular bar, a percentage of the bar may be considered effective and included. Include calculation and justification as a comment.	RD - Record Drawings; AR - Last Assessment Report
Sec_RCF_Beam	Corrosion Loss	The loss of bar sectional area due to corrosion, input as a percentage of the original bar sectional area. Maximum corrosion loss applicable for use in this Tool is 30%. Refer to NR/GN/CIV/025 clause 7.2.3. Input "0" (zero) if no section loss is to be considered.	AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCF_Beam	Are bars effectively anchored?	Only effectively anchored flexural steel may be considered in calculating shear enhancement. The assessor can select "Yes" or "No" from the drop down list. If "No" is selected, the shear reinforcement will be considered ineffective and no shear enhancement will be permitted.	RD - Record Drawings; AR - Last Assessment Report
Sec_RCF_Beam	No. of shear legs	The number of effectively anchored shear legs the transverse section (i.e. within the breadth, "b"). The shear legs may be vertical or bent up. (Note that inclined links must be input as bent up bars). See the sketch provided. A numerical value must be entered. Input "0" (zero) if there are no shear legs. Note that the assessor must only consider and input properties of the bent up bars or inclined links where they comply with the recommendations in BA 44 cl. 5.3.3.2.	AR - Last Assessment Report; IR - Last Inspection for Assessment report





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Sheet name	Input data	Description	Suggested Sources
Sec_RCF_Beam	Spacing	Distance between the reinforcing bar centres. Input "0" (zero) if there are no links (vertical) or bent up bars.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_RCF_Beam		The angle between the bent up bars (where they exist) and the horizontal. See the sketch provided. Where the angle exceeds 45° the assessor should refer to BA 44/96 cl. 5.3.3.2.	RD - Record Drawings; AR - Last Assessment Report





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Sheet name	Input data	Description	Suggested Sources	
		This sheet may be used to input the section properties for a rectangular, pretensioned concrete beam.		
Sec_PTR_Beam	Source	Select information source from drop down menu - 13 options (refer to tab "General" for information sources)	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report	
Sec_PTR_Beam	Units	Select units from drop down menu - 4 options ("in", "ft", "m", "mm") except for Area of strand/wire where assessor to select from 4 options ("in^2", "ft^2", "m^2", "mm^2").	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report	
Sec_PTR_Beam	Depth	Vertical dimension of the pre-tensioned beam. See the sketch provided.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report	
Sec_PTR_Beam	Width	Horizontal dimension of the pre-tensioned beam. See the sketch provided. All beams considered in the Tool are rectangular and symmetrical about y-y axis. Generally the 'Width' input should equal the 'Loading width'.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report	
Sec_PTR_Beam	Diameter	Diameter of the shear reinforcement (links), pre-stressing tendons or tension reinforcement. Input "0" (zero) if there is no reinforcement in that section. Pretensioned beam sections must have tendon details input.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report	
Sec_PTR_Beam	Corrosion Loss	The loss of bar or tendon sectional area due to corrosion, input as a percentage of the original bar sectional area. Maximum corrosion loss applicable for use in this Tool is 30%. Refer to NR/GN/CIV/025 clause 7.2.3. Input "0" (zero) if no section loss is to be considered.	AR - Last Assessment Report; IR - Last Inspection for Assessment report	
Sec_PTR_Beam	Shear Reinforcement: Spacing	Distance between the shear reinforcement (vertical links) bar centres. Input "0" (zero) if there are no links.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report	
Sec_PTR_Beam	No. of shear legs	The number of effectively anchored shear legs the transverse section (i.e. within the width, "b"). The shear legs must be vertical. A numerical value must be entered. Input "0" (zero) if there are no shear legs.	AR - Last Assessment Report; IR - Last Inspection for Assessment report	
Sec_PTR_Beam	Type of Pre- stressing tendons	Select tendon type from drop down menu - 6 options: ("Plain wire, wave height < 0.15Φ", "Indented wire, wave height < 0.15Φ", "Crimped wire, wave height < 0.15Φ", "Crimped wire, wave height t ≥ 0.15Φ", "7-wire standard and super strand", "7-wire drawn or compacted strand").	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report	





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Sheet name	Input data	Description	RD - Record Drawings; AR -
Sec_PTR_Beam	Area per strand/wire	The total area of each strand or wire. If a strand is made up of multiple wires input the strand area.	Last Assessment Report; IR - Last Inspection for Assessment report
Sec_PTR_Beam	Layer: No.	The number of effectively anchored tendons in each layer. Where the section assessed is within the transmission zone of a number of tendons, the number of tendons should be calculated based on the number of tendons multiplied by the percentage of the transmission length the section is assessed.  All tendons are assumed horizontal.  A numerical value must be entered. Input "0" (zero) if there are no tendons in that layer.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_PTR_Beam	Distance to soffit	Distance from the pre-tensioned beam soffit to the centre of the tendons in the layer.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_PTR_Beam	FOR INFORMATION ONLY	An indication of the transmission length is given to aid in the calculation of the equivalent number of effective tendons at the section, to be entered into cells B34:B38.  Space is also given in cells G34:I38 to input the actual number of tendons at the section, as a reference (these values not used in Tool calculations).	
Sec_PTR_Beam	No. of bars	The number of effectively anchored reinforcement bars in the section (i.e. within the breadth, "b"). A numerical value must be entered. Input "0" (zero) if there are no reinforcing bars in the section.  Note that the number of effective bars should be calculated at the section being assessed, taking into account whether they are fully anchored or not, e.g. if the section being assessed is at a distance less than the anchorage required for a particular bar, a percentage of the bar may be considered effective and included. Include calculation and justification as a comment.	RD - Record Drawings; AR - Last Assessment Report
Sec_PTR_Beam	Concrete cover (soffit)	Distance from the pre-tensioned beam soffit to the bottom reinforcing bars.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report





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Sheet name	Input data	Description	Suggested Sources
Sec_PTR_Beam	No. of service ducts	The number of circular ducts within the effective section. Input "0" (zero) if there are no ducts.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_PTR_Beam	Dia. of service duct	The outer diameter of any circular ducts within the effective section. Input "0" (zero) if there are no ducts.  Void formed in beam by casting in a small (service) duct.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_PTR_Beam	Depth (centre to soffit)	The distance from the pre-tensioned beam soffit to the centre of the duct. Input "0" (zero) if there are no ducts.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report
Sec_PTR_Beam	Depth (centre to soffit)	The distance from the pre-tensioned beam soffit to the centre of the duct. Input "0" (zero) if there are no ducts.	RD - Record Drawings; AR - Last Assessment Report; IR - Last Inspection for Assessment report