MOLONEY AM SYSTEMS

Bridge software and assessment methodology Manual for the

Bridges 4 Software

MODULE

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MOLONEY AM SYSTEMS

BRIDGES MODULE

1.0   INTRODUCTION:

The Moloney Asset Management System is a very easy to use and highly adaptable Excel based asset management system. Data is input into a data retention sheet and from there a number of visual basic programs generate accounting and management reports.

One of the great strengths of the system is its overall simplicity. This coupled with the fact that the end user needs only basic Excel skills in order to master the system means that you will be able to get results from the system very quickly. A more advanced understanding of Excel operations will enable the user to take the basic reports provided and operate upon them to produce new site-specific reports to cater for local requirements.

Additional reports can be programmed into the system relatively simply to meet a particular demand. But often this will not be necessary, as even a basic Excel user will find that they can amend the existing reports manually to produce a variety of new reports.

This module is the Bridges 4.xls module of the Moloney Asset Management System and the program has been designed to fulfil three basic functions.

- To provide bridge asset valuations for accounting purposes

- To provide engineering and maintenance reports

- To enable the future financial modelling of the bridge sub asset Group

- To record and retrieve bridge asset information

1.1   The Primary functional objectives of the system:

The provision of a flexible and easy to use management tool for infrastructure authorities and managers that will enable them to.

1. Manage their infrastructure assets in a cost-effective manor.

2. Prepare annual budgetary submissions based upon the real needs of the network.

3. Produce an open and easily understood means of complying with the requirements of the various accounting regulations.

4. Benchmark the Infrastructure asset condition at a particular point in time for comparison with the same asset base at a future date.

5. Adapt the basic data input and reports that are produced to meet the specific needs of their organization.

6. Forecast the maintenance and capital costs associated with the ownership of the bridge assets.

7. Record and be able to retrieve bridge asset information.

2   BASIC SET UP:

The **Bridges 4. Xls** File consists of eighteen sheets. An explanation of the function of the sheets is detailed below.

The Sheets within the File are as listed below.

Notes on file sheet

1. Notes on File

2. Br Master Sheet

3. Br Codes

4. Invalid Entries Sheet

5. Valuation Sheet

6. Bridge Condition Sheet

7. Bridge Type Sheet

8. Bridge Type Summary Sheet

9. Valuation Summary Sheet

10. Print Details Sheet

11. Prop. Works Sheet

12. Replacement Configuration Sheet

13. Capital works record sheet

14. Disposals Sheet

15. Existing Condition Sheet

16. Bridge Replacement Schedule By Age

17. User Defined Notes

18. Prog Amendments

2.1   The Drop Down Menu and Program operations

All Programme operations can be accessed via the Drop down menu Titled **Bridges4**. Located at the top of the screen. There are 12 Primary Menus each with a number of sub menus attached. To access the programs you click with the left Mouse button onto the desired menu item.

3.0   Sheets within the File

Within this section each of the 17 sheets within the file shall be examined and explained.

3.1   The "Notes on File" Sheet

This sheet contains a brief explanation of the operations of the whole of the Brisges4 file. It is intended as a quick reference sheet that will enable the user to obtain a basic understanding of the operation of the

program. In most cases this sheet will have sufficient detail to enable the user to fully operate the system with perhaps occasional reference to this manual. Note also that there are a considerable number of excel comments throughout the file. The excel comments are identified with a small red dot in the top right of the cell. If you click into such cells the comments will be displayed.

3.2 The Br Master Sheet

The Br Master Sheet can be seen as the database of the module. All data entry other than asset code details is undertaken on this sheet. The other exception is the recording of bridge capital works details, which are undertaken on the "Capital works record" sheet, but this will be dealt with later in this manual. Data entry is undertaken on Row No. 22 and it is recommended that you complete the data entry for each single bridge before commencing to enter data for the next structure.

To generate a new blank line for data entry use the Drop down Menu or alternatively the Short cut keys "Ctrl a". There are some 242 columns or fields that can be filled in for each bridge. Not all fields need be filled in and the program, at its most basic function, can be operated with as few as six fields. At this level of information all that will be possible is the basic valuation of the bridge assets. The fields that must be filled in are shaded purple within row 12 of the BR Master Sheet. The 242 available fields all have their place and are important so a detailed explanation of each of the fields is contained within section 3.2 below.

Total and average figures for the whole of the bridge asset group are contained within Row 14 of the sheet. Grey shaded cells within the body of the sheet are cells that are generated by inbuilt formulae. The Formulae are contained within Row 11 and are normally hidden from view for the sake of safety.

Formulae remain active within the body of the sheet during and after data entry until you activate the update formulae program from the drop down menu as detailed below.

BRIDGES4 / 1 A MASTER SHEET General / 3. Update Formulae in Shaded Cells

This program operation will apply the program formulae to the whole data set. It will then store the results as values only. This action minimizes the size of the file and makes for smoother overall operations.

3.2.0 Br Master Sheet – Column Details

Detailed below is a description of the function and basis behind the columns of data entry. Columns that must be filled in or are highly recommended to be filled in for the proper running of the program are detailed within the particular figure with a Grey shading of the Column Heading.

A	B	C	D	E	F	G	H	I	J
Br.	**BRIDGE LOCATION DETAIL**								
No. Mol Prog REQ	**ROAD NAME**	LOCAT. in m	REFERENCE CHAINAGE 00 AT	STREAM NAME	BRIDGE NAME	Co Ordinates		User Def	Bridge or Maj. Culvert
1	Allans Flat Rd.	720	Gap Flat Rd.	Gap Flat Creek.	Bassats Br				B
2	Back Creek Rd.	420	Myrtlefor Yackandanda	Kinchington Creek					B

Figure No.1 Table of Br Master Sheet Entries Column A - J

3.2.1 Column A Segment No.

This is a unique segment identifier that while not needed directly within this excel program must be present as an integer number. It is used within the program to locate the bottom of the data set and if one is missing the row above will be taken as the extent of the database. A number will be automatically generated here every time you create a new line of data entry. The program takes the number that is contained within cell K5 and adds 1 to it.

The cell is updated as part of the formulae update program off the Bridges 4 menu.

3.2.2 Column B Road Name

The Road Name column must be filled in even if the Bridge is not on a road. This column is often used within the program as the means of determining the number of lines of data entry and as such is an essential field.

3.2.3 Column C Location in metres

The Location of the Bridge along the Road is a very important item of information. It is a recommended field, but the program will function if omitted. The road chainage as it is known in engineering terms is generally the same reference chainage as the road pavement assets. The chainage or location is recorded in metres.

3.2.4 Column D Chainage Reference 00

This is a description of the start point of the location distance used within column C and while very important it's omission will not cause any program problems. However, a road bridge is fully located with the road name, chainage and the chainage reference point once all three entries are recorded.

3.2.5 Column E & F Stream & Bridge Name

If the stream and or bridge have a name it can be recorded here. This information is optional.

3.2.6 Column G & H Location Co-Ordinates

These fields are provided to assist with the integration of the system with a GIS system. The fields are optional.

3.2.7 Column I User Definable

This user definable field can be used for any purpose that is required. It would generally be used to assist with the recording of specific data relating to the surrounding fields.

3.2.8 Column J Bridge or Major Culvert

This field has been provided as a means of identifying the nature of the asset. It is tested within the "Invalid Entries sheet as either B for Bridge or C for Culvert and an error will be reported if it is left blank or any other entry made. However there is no program use for the field and if you need it for some other purpose you could simply ignore the reported errors in the Invalid Entries Sheet.

K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z
OVERALL BRIDGE DETAILS															
Wid B/W Kerbs m	Tot Wid m	Tot Leng m	Deck Area sqm	Br Code or Type	Prog Gen Cond 0-10	Insp Cond 0-10	No of Span	Bed to Deck m	Construction Date M/Y	E If Est.	Est Rep Date M/Y	Sub. Asset O/A Cond	User Def	Joint Wks Prop	**GENERAL DESCRIPTION**
7.5	8.3	9.3	77	RC	**3.00**	3.0	1	3.00	Jan-1975	E	Jan-2060	**2.92**	75	1.0	Single span Full RC Bridge
6.1	6.5	21.9	142	RC/ST	**4.00**	4.0	2	4.00	Jan-1958	A	Jan-2040	**3.67**	82	1.0	Large Twin span RC Bridge with steel Stringers
3.6	4.3	7.7	33	T/ST	**4.00**	4.0	1	2.80	Jan-1940	E	Jan-2030	**3.61**	90	1.0	Small Timber Bridge with steel Stringers and deck

Figure No.2 Table of Br Master Sheet Entries Column K - Z

3.2.9 Column K Bridge Width Between Kerbs

This width is an optional component but it is a vital piece of information in terms of the overall carriageway width. It is recommended that in places where there are no kerbs that the figure still be picked up as a means of identifying the available traffic Width. To this end it if recommended that the overall available trafficable width over the structure be recorded even if this is greater than the trafficable width in use.

3.2.10 Column L   Bridge Total Width

This is an essential field as this figure is used to calculate the plan area of the structure, which in turn is used to value the asset. For bridges the overall width is always the width perpendicular to the road centreline as the Bridge length is measured along the centre line. For pipes and culverts you may prefer to measure the width along perpendicular to the line of the Pipe if it is on a skew, as the Length will generally be taken as nominal size of the pipe or culvert.

3.2.11 Column M   Bridge Total Length

As above this is an essential field as it is used to value the asset. Bridge length is always taken parallel to the road centreline for bridges. As stated above it is recommended that length for culverts be taken as the actual width of a pipe or culvert with the additional area of a skewed pipe being derived from the additional structure width (length of the culvert). It doesn't matter how you organize these two measurements as long as you are consistent and the length by the width produces the plan area of the structure, as it is this area that is used to value the assets.

3.2.12 Column N – Bridge Deck Area

This Grey Shaded cell is calculated by multiplying the total length in Column M by the total width in Column L and forms the basis of the bridge costing structure.

3.2.13 Column O – Bridge Code

This is an essential field. The code is used to identify the cost structure and life cycle details of each type of bridge or culvert. Codes are entered into the **"BR Codes Sheet"** and the programme then references these values as required. There is capacity within the Programme for up to 200 individual bridge codes. Although it is recommended that you try to keep the number of codes used to a minimum.

Typically a code "T" may be adopted for a full timber bridge with the replacement cost at say $1,500 per square metre of deck area and the expected life of the asset at say 70 years. Each time you call up a code "T" bridge within the BR Master Sheet then these figures will be applied to the valuation of the asset.

3.2.14 Column P   Program Generated Condition

This condition rating is generated via a formula through the programme. This condition factor is used to set the written down value (or present value) of the asset. There are two basic options within the program for the setting of the program condition.

It can be set to the single inspection condition within column Q. Or it can be linked to the age of the bridge. Menu item 1D on the Bridges 4 menu provided an opportunity to select the required condition rating. If you choose option 1, to set the condition based upon the age of the bridge you MUST have a date of construction for all bridges within Column T. Under this option the program assesses the age of the bridge by taking the construction date from the selected valuation date in Cell BB16. It then compares the bridge age to the total asset life for each bridge code as entered into table C1 of the codes sheet and delivers a condition based upon how far through its total life the bridge is.

The second option is the preferred means of valuing the assets. In this case the Program condition is set to equal the single observed bridge condition in column Q.

3.2.15 Column Q   Single Overall Bridge Condition

This is a highly recommended field and represents the field assessment of the overall condition of the bridge. The field is not strictly a required field as the valuations could be carried out using the age of the structures. However other reports within the module would become meaningless as they are often based upon an assessed condition and not the age of the assets.

The single overall condition is quite a complex concept and authorities may wish to develop their own written guidelines for the assessment of the figure. However, detailed below is a guide to the selection of the single overall condition factor. The condition factor commences at 0 when the bridge is new and degrades to condition 10 when there is no longer any value remaining within the asset. In practice a bridge could not still be in service at condition 10 as if it were there would still be some residual value. A condition 9 bridge would also be a very rare occurrence as there would no doubt be a public risk associated with the use of such a bridge. Thus the upper condition limit tends to be around condition 8.

Condition 0 – 1

This condition rating range would be assigned to bridges in new or near new condition with no evidence at all of wear or even minor problems of a capital nature.

Condition 2 – 3

A Bridge in Condition 2 – 3 would be one that could be around 20 – 30 years old. It would be in very good to excellent overall condition with 70 – 80% of its useful life still remaining. There may be some very minor evidence of wear but no evidence of structural problems.

Condition 4 – 5

At Condition 4 – 5 a bridge would still be in relatively good overall condition. There would be no major structural problems other than those of a very isolated nature. For example a 40-year-old bridge with one faulty stringer that needed replacing could be rated at condition 4 – 5 provided the remaining stringers were OK. The assumption here is that the faulty component would be repaired at some stage. Thus rather than downgrade the whole bridge to a condition 6 or 7 a condition 5 is adopted and the details of the faulty stringer are recorded within the sub asset section of the program.

It would be expected that the bridge was at or approaching the half waypoint of it's useful life. Concrete bridges could be showing signs of surface wear in exposed areas and may need some attention in this regard. Timber bridges would be in a sound general condition.

In essence bridges within this category would be in good general overall condition. There may be some minor structural problems with some components of the bridge but these must be able to be repaired. In many cases it will simply be the age of the bridge that pushes it above condition 2 – 3 and into condition 4 – 5. It would be expected that many bridges within this condition rating would be within the 30 – 50 year age group for timber bridges, 40 – 60 year age group for concrete and stone bridges and up to 100 years for full stone bridges.

Condition 6

To be rated at condition 6 a bridge would need to be exhibiting obvious structural problems and not just be rated to condition 6 because of it's age. Often Bridges within condition 6 would be in need of major rehabilitation works within the next 5 – 10 years and may need to be subject to the imposition of load limits.

The structural problems would be such that they could be treated as the bridge would be expected to have a further 20 – 30 years of useful service life, subject to the rehabilitation improvements.

Condition 7

At Condition 7 a bridge has served around 80% of its useful life and with remedial works could be expected to serve a further 10 – 20 years. There may be quite serious structural problems associated with the bridge that if not rectifies would result in a very short future life. However, if there were severe structural problems then remedial work must be a financial and practical alternative otherwise the bridge would need to be rated at Condition 8.

Bridges in condition 7 may typically need to have load limits imposed to preserve the asset until remedial work is undertaken. Bridges that do not require remedial work or where remedial work is impractical or inappropriate would still be exhibiting obvious structural problems.

Condition 8

Bridges within condition 8 are considered to be past their desirable replacement condition level. There would be serious structural problems associated with the bridge and generally major rehabilitation of the structure would not be a practical alternative.

Often load limits would be in place or need to be imposed and the bridge should be planned for replacement within the next 10 years. A bridge in Condition 8 may serve for several years in that state on a minor road with load limits imposed.

Condition 9

In practice Bridges should not be allowed to remain in service at Condition 9. There would be very severe structural problems associated with the bridge. Major rehabilitation would not be an option. And in all likelihood load limits down to 2 tonne gross mass would be in place. Typically if a condition 9 bridge were to remain in service it would be for light car traffic only and would generally have a sidetrack or alternative route for heavy vehicles. The bridge would be in such a state that it could be expected to fail under moderate loads at any time hence its expected life would be 0 – 5 years.

Condition 10

A bridge in condition 10 would have no residual value and could not be still in service. Any bridge that is still in use would have a maximum condition rating of Condition 9.

3.2.16　　　Column R　Number of Bridge Spans

The number of bridge spans is recorded here. If the spans are all equal spans then no other information is required. However, if the spans are different lengths then it is recommended that a note be made within the General Comments within Column AG.

3.2.17　　　Column S　Bed to Deck Height

This information is recorded as a very rough means of providing the waterway capacity of the structure. It is not intended to be perfect but it is useful information to have on hand when needed. The distance can be either a maximum or an average height depending upon your needs. It is recommended that an Average height be adopted.

3.2.18　　　Column T – U　　Year of Construction

Often the year of construction of a bridge is recorded on a plaque or on other components of the bridge. If this is the case then the year is recorded within Column T in an excel data format. Column U is used to identify if the data of construction is an actual date or an estimated one. The only allowable entries in this column are E or A.

If there is no indication of the year of construction then an experienced assessor will generally be able to estimate the year of construction within a margin of 5 -10 years. This column should always be filled in as it is used within the programme to develop an age distribution profile of the assets. If the year of construction is an estimated figure it is recommended that an "E" be placed within Column U to indicate this.

3.2.19　　　Column V　　　　Estimated Year of asset Replacement

The assessor is required to estimate the year at which the structure will need to be replaced. Here the assessor will need to take into account the condition of the bridge as well as the importance of the road. The assessor's decision may be a first step, which will be subject to amendment later as an office exercise but it is important that this figure be filled in, as it is also a check on the single Inspection condition assessment in column Q. The figure is also used to generate a distribution graph of the future asset replacement schedule against time.

3.2.20   Column W   Sub Asset O/A Condition

This is a program-generated field that takes the sub asset condition field in column BX and combines it with the inspection condition in column Q to deliver a new condition rating. The idea being that if the condition varies from the inspection condition by more than one whole condition rating you should re-examine all condition ratings. The field assists with the overall integrity of the data.

3.2.21   Column Y   Joint Works Proportion

The default setting here is 1.00 and there must be a figure within this column between 0 and 1.00. The figure is used to cost the capital portion of the individual bridge that is the direct responsibility of the authority. Often bridge structures on local government boundaries will have a shared capital responsibility between the two authorities. This facility allows you to account for the asset in the proportion that is your direct capital responsibility. The Joint Works Proportion applies only to the Capital value of the assets and not the works requirements.

3.2.22   Column Z   General Bridge Description

This is not a required field and is intended as a brief useful summary statement of the overall type of construction. E.g. "Triple span Full RC U-Slab Bridge"

3.2.23   Column AA- AF   User Defined Fields

These fields were used as general maintenance condition fields in former versions of the program. If you are not collecting data on the bridge sub assets from column BW on then you may wish to record here some basic maintenance information relating to the bridge. The fields can be used for any purpose that you require.

3.2.24   Column AG   General Comments

Comments of a general nature relating to the overall structure or maintenance matters are recorded here.

AH	AI	AJ	AK	AL
Proposed Bridge Replacement Details				
Prop. Code	Overall Width m	Overall Length m	Value of Earthworks & Special Features	Comments relating To the Proposed Bridge Replacement
RC	28.90	8.60	160,000	Replace Existing Low Level structure with full High Level bridge and undertake earthworks on approached.

Figure No.4 Table of Br Master Sheet Entries Column AH - AL

3.2.25   Column AH - AL   Proposed Replacement Structure Details

The programme has been set up to enable you to cost a replacement bridge structure that is different to the existing structure. For the purpose of basic accounting valuations, the replacement cost of the existing structure is used. However, in some instances the structure that will replace the existing one may be very different.

It could be that a large existing bridge on what has become a very minor road over time will be replaced with a low-level floodway or simply not replaced at all. While a narrow existing bridge on a poor alignment on what is now an important road may be replaced with a structure costing many more times the replacement cost of the existing structure. Columns AH - AK allow you to specify a code for the new bridge as well as it's new overall dimensions and to place a lump sum in for other items such as Earthworks, land acquisition, special protection works etc. Column AL is reserved for a brief explanation of the proposed amended bridge details.

The costing outcome from this area of data entry is recorded within the **"Replacement Configuration Costs Sheet".** Within this sheet if entries have been made within the above cells then the replacement structure is costed on the proposed replacement basis. If no entries are made then it is assumed that the existing bridge will be replaced in its current form. The overall results of the sheet provide a far more accurate picture of the future liability costs associated with the asset group.

AM	AN	AO	AP	AQ	AR	AS	AT	AU	AV
ADDITIONAL FEATURES ASSOCIATED WITH BRIDGE ASSET					**ADD FEATURE VALUATION**				
DESCRIPTION	CODE	Cond	User Def	User Def	Feat Dep Life	Replace. Value $	Written Down $	Accum Dep $	Annual Dep $
Extensive down stream RC Drop Structure	DS	6			80	85,000	34,000	51,000	1,063

Figure No.5 Table of Br Master Sheet Entries Column AM - AV

3.2.26   Column AM - AV   Provision for Additional Features

The costing structure built into the programme is based upon the plan area of the bridge or major culvert only. The basic bridge costs are derived by multiplying the plan area by the unit cost per square metre assigned to the particular bridge code within the **"Br Codes Sheet"**. Thus any additional works or features associated with the bridge or culvert must be costs separately.

Columns AM - AS are used to record the details of the additional feature. An Additional feature is any additional asset that is not part of the plan area of the bridge or culvert and is considered to be of significance. For example concrete endwalls may or may not be associated with major culverts so the basic cost should not include the endwalls. Thus these must be accounted for separately if an accurate picture of the total asset replacement cost is to be achieved.

In the example above a reinforced concrete drop structure (artificial waterfall) was present on the downstream side of the structure with a value of $85,000. This being quite a significant asset it must be recorded.

The life of any particular additional feature may vary greatly as will the replacement cost. The assessor is required to estimate the life and replacement cost on site. However this may be amended later as an office exercise. The grey shaded columns of, written down value, accumulated depreciation and annual depreciation are all generated by the programme. See the next section for details of the calculations for bridge asset valuations for further details.

AW	AX	AY	AZ	BA	BB	BC	BD	BE
BRIDGE VALUATION					**TOTAL VALUATION**			
BRIDGE DEP. LIFE YEARS	REPLACE. VALUE $	WRITT. DOWN VALUE $	ACC. DEP. VALUE $	ANNUAL DEP. VALUE $	REPLACE. VALUE $	WRITT. DOWN VALUE $	ACC. DEP. VALUE $	ANNUAL DEP. VALUE $
100	318,304	63,661	254,643	3,183	340,304	74,661	265,643	3,458
100	180,873	144,698	36,175	1,809	185,873	148,698	37,175	1,871

Figure No.6 Table of Br Master Sheet Entries Column AW - BE

3.2.27 Column AW - BE Bridge Valuation Details

All of the values within the above figure are generated from within the programme. The bridge depreciation life figure within column AW is drawn from the **"Br Codes Sheet".** This is achieved by referencing the corresponding bridge code within column "O". The Bridge replacement value in column AX is derived by multiplying the bridge surface area in column N by the replacement value per square metre corresponding to the adopted code in Column O.

The Bridge Written Down value is derived by factoring back the replacement value in a linear manor according to the Program Generated condition in Column P. The other consideration in this calculation is the required end point for the WDV as recorded in Cell C8 of the BR Codes Sheet. The condition recorded in Cell C8 is the condition at which your WDV equals zero. This is generally a number below the worst condition of 10 as a bridge in Condition 10 could not really be in service. If however you were basing your program condition on age then the figure would be condition 10.

The bridge accumulated depreciation in Column AZ is the difference between the replacement value and the written down value and represents the accumulated loss in asset value due to the less that new condition of the asset. The annual depreciation of the bridge asset in Column BA is calculated as a straight-line depreciation by dividing the replacement value of the bridge in Column AX by the bridge depreciation life in Column AW. Columns BB - BE represent the total asset valuation figures for the bridge and are generated by adding the basic bridge valuation figures to the additional features figures.

The formulae used for all of these calculations are generally hidden within Row No.11 but they may be accessed and amended if required. If for instance you wished to amend the straight-line depreciation then you could place into Cell BA11 any formulae that you required. To view the "Hidden Copy Block" on row 11 go to the drop down menu as detailed below.

BRIDGES4 / 12 COMMON FUNCTIONS / 8. Display Hidden Copy Block (Ctrl h)

BF	BG	BH
Traffic Count		
Number	Percent Heavy	Location
6,000	12	A5
250	5	B95

Figure No.7 Table of Br Master Sheet Entries Column BF - BH

3.2.28   Column BF - BH   Traffic Count Details

If available the traffic count details for the road would be placed within these cells. At present the programme does not take these figures into account. However, it would be a very simple operation to amend the Sub Asset bridge overall condition within Column P to include a consideration of this information if it were available. Bridge replacement and rehabilitation works could then be influenced by the traffic volume figures.

BI	BJ	BK	BL	BM	BN	BO	BP	BQ	BR	BS	BT	BU
General Details												
	Load Limits		GIS No.	Asset No.	I.D. No.	Photo No.	Date of Insp.	Council Bridge No.	Data Capture Sheet No.	User Def	User Def	User Def
Existing Limits Tonnes	Proposed Limits Tonne	Reason for Load Limits										
10	2	Timber Stringer Condition	2			2_4	Jun-06	536	25			R
	30	General Configuration	36			17_19	Jun-06	589	90			R

Figure No.8 Table of Br Master Sheet Entries Column BI - BU

3.2.29   Column BI - BU   General Bridge Details

This section contains a series of general information items relating to the bridge assets. Columns BI & BJ contain any existing or proposed load limit requirements. Column BK is used to provide an explanation for the proposed or existing load limits. The assessor would record any existing limits that were encountered and would also make initial recommendations regarding any proposed new limits. New load limits may require further investigation before their implementation but the recommendation would be recorded in column BJ.

Columns BL - BR contain a series of cross-references to other systems as well as the date of the bridge inspection. The date is very important in the development of degradation curves based upon the observed condition change with time. Columns BS - BU have been set aside as user defined fields.

BV	BW	BX
	No ofSub Asset Component Assessed For Cond.	Bridge Cond. By Sub Asset Consideration
	10	**4.60**
	10	**1.40**

Figure No.9 Table of Br Master Sheet Entries Column BI - BU

3.2.30   Column BV - BX   Bridge Sub Asset Condition

Column BV is a vacant column used to separate the general bridge details from the more specific sub asset section. Columns BW & BX are both generated by the programme and represent the Number of sub asset components within the particular structure that have been assessed and the average condition of those sub assets respectively.

The number of sub assets assessed is needed in the calculation of the average bridge sub asset condition in Column BX and is the count of the condition factors for all sub assets considered including the Additional Features. The Average Condition by sub asset consideration represents another way of looking at the bridge condition.

BY	BZ	CA	CB	CC
ABUTMENT	**FOUNDATIONS**			
Code or Type	Cond 0-10	DESCRIPTION OF EXISTING ASSET	User Def	User Def
RC	**2.0**	Cast in Place RC Spread Footings on Rock		
RC	**3.0**	4 No 350 x 350 Precast RC piles		

CD	CE	CF	CG	CH
		DETAILS OF PROPOSED ASSET WORKS		
Deg Urg 0-10	Est. Cost $	DESCRIPTION OF PROPOSED WORKS	Code Prop Treat	Year of Treat
8	5,000	Repair Eroded area around Bridge Foundations	M	2007
3	500	Repair Spalled area on one pile	M	2008

Figure No.10 Table of Br Master Sheet Entries Column BY - IB

3.2.31   Column BY - IB   Bridge Sub Asset Details

Columns BY - IB are set-up to record the construction details, Condition and works requirements for the 16 individual bridge sub assets. The 14 sub asset components have been identified for each bridge with two additional locations provided as user defined sub asset groups for odd bridge components that do not fall within any of the other 14 categories.

The Figure above illustrates the format for the recording of sub asset information. Each Sub Asset has it's own Block with two areas. The first records the details of the sub asset and it's condition and the second the details of any proposed works that the assessor considers should be undertaken. Listed Below are the groupings of sub assets that have been included within the system.

1. Abutment Foundations
2. Pier Foundations
3. Abutments
4. Piers
5. Cross Heads
6. Stringers or Longitudinal Beams
7. Transverse or Cross Beams
8. Deck Structure
9. Expansion Joints
10. Traffic Wearing Surface
11. Guard Rail
12. Hand Rails
13. Endwalls
14. Signs
15. User Defined Sub Asset 1
16. User Defined Sub Asset 2

The example on display within the figure above is from the Abutment Foundation sub asset and the set up is similar for all other sub assets. The code or type used to describe the sub asset is not used within the program at this stage but is intended as a means of quickly finding all sub asset components of the same type. For example all Reinforced Concrete abutments or all bridges with Timber Stringers could be identified quickly using the automatic filters (See later for Filter set up Details). The Sub asset condition is a very important figure and will be used extensively in the selection of rehabilitation works on structures.

The description of existing asset is also important. It is recommended that the description be kept brief via the use of standard abbreviations such as RC for Reinforced Concrete. The aim of this exercise is to record enough information to enable an informed user of the system to build up a picture of the bridge and how it fits together. Where possible all Structural Component sizes and spacings should be recorded. For example Timber stringers may be recorded thus.

4 No. 450 Dia. timber beams at 1450 Cts. 6.8m span.

The span details may be omitted if this information can be obtained from the overall dimensions of the bridge and the number of spans. Two additional columns have been allocated for any new or specific details that you wish to record.

The second part of the individual Sub Asset detail deals with any associated works that are considered necessary. Within the Example above there are works projects identified for the abutment foundations of both bridges that are listed. The first project has identified a serious erosion problem with the foundations of the bridge while the second involves remedial work on a spalled concrete area of one pile.

There are 5 Cells to be completed in relation to each proposed works item. The first is the Degree of urgency of the work and is ranked from 0 - 10 with 0 having no urgency and 10 representing a project that is desperately urgent and would tend to have either public safety or further financial loss implications if not undertaken. The urgency rating is very useful in determining the priority of the full proposed works list.

Next the assessor is required to make an initial estimate of the cost of the works. This costing will not of it's very nature be highly accurate but with an experiences assessor it will represent a good starting point. You may wish to use one of the spare columns immediately preceding this section to record any further amendments to the cost following further investigation. Or you could use the Comments facility within Excel to record details of any refinement of the estimate at a later date.

The description of the proposed works is also important and must be kept brief in order to enable it to be displayed when printed. Once again if additional information is required to be stored then this can be done as an Excel Comment attached to the Cell. (From the Drop Down menu Choose **Insert - Comment**.).

The works codes can be as extensive as you wish. An example of the codes is detailed below.

M   **Maintenance**

CI   **Capital Improvement**

CR   **Capital Renewal**

I   **Further inspection or investigation Required**

The proposed year of works treatment is also to be filled in by the assessor as a further means along with the Urgency rating of setting up a works programme.

All of the items identifies within this section of the **"Br Master Sheet"** are transferred to the **"Prop Works Sheet"** of the programme during the running of the Proposed Works report programme. The **"Prop Works Sheet"** is thus a consolidated list of all works items that have been identified as requiring attention. The sheet has several options that will be discussed later within the "Prop Works Sheet" section

ID	IE	IF	IG	IH	II	IJ	IK
Age of Bridg in Year	Year To Prop Repl	Tota Life in Year	Prop Rep Confi unit Cost	Rep Cost Prop Confi	Rep Cost Exist Confi	This Colum Use for Calc	This Colum Use for Calc
31.0	54	85	1,00	408,54	75,25	30	100
48.0	34	82	0	0	142,35	47	100

Figure No.11 Table of Br Master Sheet Entries Column ID - II

3.2.32 Column ID - IK Bridge Age Figures

Columns ID – IK contain details that are all generated by program operations and used within various reports in the file they are not for general use but may be of interest.

The program uses the figures as a means of automatically filtering to establish the asset replacement valuations within each decade. Note that if there is no replacement structure nominated then the program assumes that the bridge will be replaced in its present configuration.

3.3 Br Master Sheet – Functions from the drop down menu

The BR Master sheet is the heart of the bridge program and contains all of the relevant bridge information. It is from this sheet that most other report sheets within the file are generated. There is a vast array of information within this sheet that can be accessed using the standard Excel tools and in some instances is the only location where all relevant data associated with a bridge can be considered.

Before going further it must be stressed that following a survey of bridge assets the data within the Bridges4 .xls File is extremely valuable and has been assembled at considerable cost. Thus the protection of the data is imperative. To this end it is recommended that a backup copy of the file be maintained at all times to prevent the loss of valuable data. See the Backup provisions on the Bridges4 drop down menu. If you maintain a current backup file then the Bridges4 file it can be reinstated at any time from the backup copy.

The Bridges4 drop down menu has 16 primary program levels as detailed below.

1A   Master Sheet General

1B   Master Sheet Sorts

1C   Master Sheet Formats

1D   Set Bridge Valuation Condition by Age

2   Master Sheet – Invalid Entries Report

3   Run Reports

4   Valuation Sheet

5   Condition Sheet

6   Bridge Type Sheet

7   Proposed Works Sheet

3.3.1   Menu 1A Master Sheet General

This menu level contains the basic Master Sheet operations. It will allow you to add a new line for data entry. Remove the blank shaded lined between new rows of data entry. These lines are created when you call up a new row for data entry in an attempt to avoid you accidentally loosing data from existing records. This program operation removes the blank lines and sorts the data set into alphabetic order.

The last two options on the menu update the grey shaded cells within the master sheet that are all generated by formulae and update the total and average row within row 14. No active formulae remain within the Master sheet other than the totals on row 14. This helps with overall program performance and below are details of the programs attached to the two menus. Note that the Common Functions menu applies to all spreadsheet type reports within the file and not just the BR Master Sheet.

3.3.2   Menu 1B Master Sheet Sorts

There are 4 standard sorts of the data set available from this menu item that have been found to be quite useful.

3.3.3   Menu 1C Master Sheet Formats

There are 6 small programs attached to this menu level all of which relate to the formatting of the Master Sheet. The first allows you to format the whole of the Master Sheet data set to the standard formatting contained within the "Hidden Copy Block" within row 11. This can be quite useful to return the data set to a common format if you have temporarily coloured certain assets to make them stand out. You can also reformat row 11 and have your own standard formats transferred to the whole of the data set.

The second menu item brings in a set of excel field comments that are housed within row 2 of the "Invalid Entries" Sheet. You can bring them in or view them on the "Invalid Entries" Sheet. The comments will provide you with a wealth of information about each Master Sheet field.

The other 4 items all have short cut keystrokes and tend to be common to all Moloney Programs.

3.3.4   Menu 1D Master Sheet Set Bridge Valuation Condition by Age

There is an option within the program to set the Program condition in Column P of the Master Sheet (used for valuation purposes) based upon the age of the assets or the single observed Inspection condition in Column Q.

If set by age the program takes the construction date in Column T from the valuation data in Cell BB16 to deliver an age of the bridge. It then creates a program condition by comparing the age to the design life as recorded in table C1 of the Br Codes Sheet for the particular type of bridge. The program goes on to deliver the selected condition factor to column P and to then use that condition to update the Written Down Value in Column AY.

3.3.5   Menu 2 Master Sheet Invalid Entries Report

The program has a very well developed data integrity checking mechanism. It is carried out after data entry and all problem data identified is reported upon within the "Invalid Entries" Sheet. This sheet contains a

description of the invalid entry as well as its cell location. When dealing with "Missing Entry" faults you may need to check related fields as this error generally relates to some entry that is required within a given group of data fields and the problem may be with one of the related fields.

The full Invalid entries report should always be run and rectified after data entry and before running other reports.

3.3.6 Menu 3 Run Reports

There are 12 items on this menu level that allow you to run all program reports as a whole or to run individual reports as required. There is also a function to clear all reports from the file to assist with minimising the file size.

3.3.7 Menus 4 - 11 Report Sheets

These 8 menu item all relate to the running sorting and formatting of individual report sheets. See the sections below relating to the individual report sheets for more detail.

3.3.8 Menus 12 Common Functions

This menu has 10 commonly used excel functions that have been programmed into the file to assist with the better use of the file. They all have short cut key operations that are displayed on the menu. It would be worth getting to know the operations such as Protection, Filters and Freeze panes as they are all used quite often and these short cut keys can save a lot of time.

The operations are mostly common to all Moloney software and the same short cut keys used within the different modules. This is good for consistency but it sometimes causes a problem if more that one of the Moloney Modules is open with the same short cut keystrokes. If you have problems with the short cut keystrokes then shut down the other Moloney programs and this may help. Also if the Caps Lock key is activated on the keyboard this can cause problems.

The common functions on this menu level are self-explanatory and are as detailed below.

1. Protect active Sheet   Ctrl Shift   P

2. Remove Protection   Ctrl Shift   U

3. Set up Autofilter on active sheet   Ctrl   e

4. Remove Autofilter from Sheet   Ctrl   r

5. Freeze panes to view data   Ctrl Shift   E

6. Remove the freeze panes   Ctrl Shift   R

7. Select all Data for a manual Sort   Ctrl   x

8. Display Hidden Copy Block   Ctrl h

9. Hide Hidden copy Block   Ctrl Shift H

10. Show all columns on active sheet   Ctrl Shift D

3.3.9 Menus 13 Backup and Import from Access

This menu item allows you to both send and retrieve all of the variable data within the Bridge 4.xls file to a backup file in the same directory called BackBr.xls. The facility serves two main purposes. First of all it provides a backup of all of the variable data within the Bridges 4 file. Secondly it assists with the transfer of data from an old to a new Bridges 4.xls file

To transfer Bridge data to a new file first backup the variable data to the Backup file then place the newly backed up file into the same directory as the new Bridges 4.xls program file and use option 2 of the backup

4   Br Codes Sheet

The Br Codes Sheet is a Sheet dedicated to the storage of all Codes used within the programme.

4.1   Br Codes Sheet – Overall Bridge Codes Table C1

The first code block commencing at Cell A8 of the BR CODES Sheet contains data relating to the unit price per square metre and the estimated life cycle assigned to each bridge type or Code.

For example, you may create a type or code for your full reinforced concrete bridges. The code can be in any format but it is recommended that simple easy to recognize codes be adopted. In the case mentioned the code could Be RC. The description may be "Full Reinforced Concrete Construction" and the unit replacement price per square metre may be $1,800.00 with an expected life of 100 years. With this code in place you can then designate that type of bridge within column O of the BR Master Sheet by the use of the RC code. The bridge will then be valued and depreciated on the basis as set out within the BR CODE Sheet.

Please note that if you are entering major culverts into the system then the only way that they can be costed within the programme is on a plan view, square metre basis. Thus if you adopt a single code for all reinforced concrete pipes then they will all be costed on a plan view square metre basis at the same rate irrespective of the pipe size. This may be OK if the starting point for Major Culverts is large, say 1500mm Dia and above. But if you intend to place smaller culverts into the system (and there is no reason why you cannot do this) then it would be wise to create several codes for various ranges of pipe sizes. Alternatively you could create a separate code for every unique culvert type and size adopted.

Cell C8 within Table C1 of the Br Codes Sheet is the condition rating at which you require to rehabilitate the assets. It is thus the end point for the written down value. That is the WDV will be zero at the condition nominated here. This asset Rehabilitation Condition Must be between 3.0 and 10.0. It represents the condition at which you intend to intervene and rehabilitate the asset.

It is used within the program as the end point for the written down value. That is when the asset reaches this condition it's WD value will be Zero. It effectively allows you to peg the upper limit of the 0 to 10 condition scale for valuation purposes.

If the Program generated Condition is based upon age then this figure must be 10. If the figure is based upon an observes condition then it would be the upper limit at which you would still have a bridge in service. This is generally at or around condition 8.

4.2   Br Codes Sheet – Works Treatment Codes Table C2

This table contains a record of the proposed works treatment codes as used in the sub asset sections of the Master Sheet starting at Column CG. The codes have no programme function at this stage and are intended as a means of determining the nature of the proposed works. The codes are fully used definable and a suggested methodology is detailed below.

Recommended Works Treatment Codes used within the "**Details of Proposed Sub Asset Works**" section of the **BR Master** Sheet

M	**Maintenance**
CI	**Capital Improvement**
CR	**Capital Renewal**
I	**Further inspection required**
C	**Comment only no action required**

4.3   Br Codes Sheet – Sub Asset Identification Codes Table C3

Again this is a fully used definable set of codes that are used to describe the nature of the materials within the sub asset sections commencing at column BY. It is recommended that the codes be adopted as RC for Reinforced Concrete, T for Timber etc. If you adopt this method you will be quickly able to locate, by way of example, all of the timber stringers in the stringer sub asset section via the excel filters.

4.4   Br Codes Sheet – Sub Asset Identification Codes Table C4

Table C4 on the Codes Sheet the Works Activity Code, is associated with the "Capital Works Record" Sheet. (Column CE). The idea being that you can allocate a code to the type of bridge Capital works activity that was undertaken and then track them as a group at some future date. The codes are fully User Definable and at this stage are not checked for accuracy within the program.

4.5   Br Codes Sheet – Additional Features Codes Table C5

This code table relates to Column AN on the "Br Master Sheet". It is a fully user definable code that relates to the type of Additional Feature present. The code is validated within the Br Master Sheet during the running of the "Invalid Entries" Report.

Cell X8 contains the designated end of the Written Down value condition Range. See Section 4.1 for More Details.

4.6   Br Codes Sheet – Additional Features Codes Table C5

This code table is provided as a means of recording any abbreviations used within the sub asset description fields commencing at Columns CA and CF of the Br Master Sheet used to describe both the Sub asset make up and any required works. The purpose is to minimise the text in the particular descriptive fields but to provide a means of finding the abbreviation here.

As an example you might use the abbreviations RCP for Reinforced Concrete Pipe or U-Slab for Precast Reinforced Concrete U Type Slabs. No check is made on the accuracy of the data within the program. It is meant as a local record only

5   Invalid Entries Sheet

The Bridges 4.xls File has a very comprehensive inbuilt data validation system. Data within the Br Master Sheet is validated against the Br Codes Sheet (where appropriate) as well as expected ranges for numeric cells and missing data in critical areas.

The test is undertaken after data entry or after amendments to the data set on the Br Master Sheet. The test is accessed from Level 2 of the Bridges 4 Menu and the results are reported within the "Invalid Entries Sheet. The report will include a reference to the problem cell location on the Br Master Sheet as well as details of the nature of the problem. There is also a legend within row 13 to indicate the relative importance of the errors and how they will impact on the overall running of the program. Your aim should be to have no errors within the database.

6   Valuation Sheet

The Bridge "Valuation" Sheet is a summary sheet for accounting purposes, of all of the bridge assets with their individual valuations and depreciation details listed. The data is drawn directly from the "BR Master Sheet" and represents all of the data relating to each bridge other than the individual sub asset details starting at Column BW.

The sheet is formatted ready for A4 printing but does have far more information contained within the sheet than is capable of being printed on an A4 sheet. There are in fact around 3 sheets of A4 format width necessary to print out the whole of the valuation sheet. You may view the whole of the details by using the short cut keystrokes Ctrl Shift D or see the Common Functions drop down menu. You may wish to display different columns of information to those within the standard format set up. The sheet is designed as an asset valuation sheet formatted for easy presentation.

Level 4 of the Bridges 4 Menu contains 6 sub programs all related to the Valuation Sheet. The first can be used to create a new report sheet. The next 4 provide a series of resorting options while the last formats the sheet ready for A4 printing. The 6 menu options are as detailed below.

1. Run Original Valuation Report

2. Sort by Road Alphabetic Order

3. Sort by Type of Code of Bridge

4. Sort by Stream Name

5. Sort by Value of Bridge

6. Format Sheet for A4 Printing.

7   BRIDGE COND.   Sheet

The Bridge Condition Sheet is similar in format to the valuation sheet. However, in this case the theme of the presentation is hinged around the condition of the bridges. Once again there is a great deal more information within the sheet than can be displayed within an A4 Sheet.

The bridge replacement costs within this sheet are all based upon the replacement of the bridge with the same structure as currently exists. That is, no account has been made of the "**Proposed Bridge Replacement Details**" within Columns AH - AL of the "**BR MASTER SHEET**".

The Bridge Condition sheet has its own menu on the Bridges 4 menu with the 8 program options as detailed below.

1. Run Original Bridge Condition Report

2. Sort by Bridge Condition

3. Sort by Sub Asset Overall Bridge Condition

4. Sort by Bridge Type or Code

5. Sort by Year of Construction

6. Sort by Proposed Year of Replacement

7. Update Cumulative Total in Column BM

8. Format Sheet for A4 Printing

The **"Update Cumulative Total in Column BM"** is provided because this sheet is often used as a means of developing a print out for the target list for bridge replacements and as such certain lines of data may be

manually deleted for presentation purposes. If you do delete a line, in some cases the formulae used to update the cumulative total will be damaged. This program will reinstate the cumulative total figures.

Remember that this sheet is fully developed via the internal programs and as such you may amend the sheet at will for a specific presentation knowing that it can be generated in its original format via the drop down menu command above.

8   BRIDGE TYPE Sheet

This sheet provides a summary of the bridge types as detailed by the codes that you have adopted. The report lists all of the bridges within the BR Master Sheet and then groups them into their overall bridge code types and provides a summary of the overall results within each group of code type.

So all of the Code "T" (Full Timber Construction Bridges) would be grouped together with section total and average figures. The bridges within each code group are also sorted by asset condition so the worst condition bridge within each group would be at the top of the list. There is dedicated menu item on the Bridges 4 Menu for the report sheet with s program items as listed below.

1. Run the Original Bridge Type Report

2. Update Cumulative Total in Column BV

3. Format Sheet for A4 Printing

9   BRIDGE TYPE SUMMARY Sheet

This sheet represents a summary of the sub total details contained within the **"BRIDGE TYPE Sheet**". The sheet contains only the bridge type or code summary lines from the "BRIDGE TYPE Sheet". The sheet is a quick reference to the number and total asset quantities and valuations for the nominated bridge types within the programme.

There is no specific drop down menu for this sheet. The original report can be run by accessing item 9 on the Run Reports level of the Bridges 4 Menu.

10   The Valu. Summary Report Sheet

This sheet contains a single A4 page print out of the overall bridge valuations. It contains no other data and is generated either when all reports are run or via Item 10 of the level 3 Run Reports Menu.

11   PROPOSED WORKS Sheet

This sheet presents a list of all of the proposed works items that were identified during the bridge survey. The bridge details as well as the works requirements are transferred to the report with one line for every individual bridge job. Note that there may be more than one project nominated for each bridge, as the method of recording is to nominate each works proposal against the particular bridge sub asset.

As with other report sheets this one also has its own menu containing 6 program options. The first will generate a new report; the next 4 provide various sorting options while the last will format the sheet for A4 printing. The 6 menu items are detailed below.

1. Run Original Proposed Works Report

2. Sort by Works Urgency

3. Sort by Road Alphabetic Order

4. Sort by Bridge Type or Code

5. Sort by Type of Bridge Sub Asset

6. Format Sheet for A4 Printing.

12   Replacement Configuration Cost   Sheet

This sheet reports on the bridge replacement costing based upon the proposed bridge replacement configuration and not the existing. The purpose of the sheet is to provide an estimate of the future capital liability associated with the true bridge replacement configurations.

If you enter data into Columns AH - AL within the Br Master Sheet (Proposed Bridge Replacement Details) then these details are substituted for the existing bridge details in so far as they relate to the costing of the new structure. Other details still relate to the existing structure. The intention here is to provide a means of costing the actual proposed bridge replacement cost in the format that you intend to replace it rather than presenting the cost of the existing structure.

Within the report if a bridge has been allocated a proposed replacement configuration, then the road name cell in column B of the sheet for that line of entry will be shaded purple. If no entries have been made within the proposed bridge replacement details section of the Br Master Sheet then this report will still be completed but the figures within it will be the same as for the condition sheet report.

The sheet presents an estimate of the bridge replacement valuation and the future annual liability cost of the bridge assets in the actual configuration that is proposed. The sheet has its own menu item at level 8 on the Bridges 4 menu with 5 items as detailed below.

1. Run the Replacement Configuration Cost Report

2. Sort by Road Alphabetic order

3. Sort by Bridge Condition

4. Sort by Bridge Type then Condition

5. Format Sheet for A4 Printing

This is the sheet that will be of most interest in terms of looking at bridge replacement programmes. For example it may be that an existing narrow low-level bridge on a major road needs to be replaced with a structure 3 or 4 times the plan area of the existing structure with say $200,000 additional costs in approach works. While a large old timber bridge on a now low traffic minor road could be replaced with a low level concrete culvert and floodway at a fraction of the cost of the original structure. The replacement cost configuration report enables you to model all of these options and present realistic replacement proposals.

13   PRINT DETAILS   Sheet

The print details sheet was developed as a means of gathering all of the input and basic valuation information relating to the one bridge and presenting it within a single sheet. The programme first generates a blank form at the top of the sheet formatted for copying as a template. Then it proceeds to copy the template and fill in the information for each individual bridge by scanning across an individual row of data entry on the **"BR Master Sheet"** and copying the details to the **"Print Details Sheet"**

The process is a little slow but it is the kind of operation that would be undertaken only very rarely, following the update of data within the system. Before commencing the running of the programme you should give a little thought to the order of the data within the "BR MASETR Sheet". The final order of the sheets within the

"PRINT DETAILS Sheet" will be the same as the row order of bridge date within the "BR MASETR Sheet". In most cases the simplest way to arrange the data would be in alphabetic order. However, you may wish to arrange the bridges into one of the other standard sort orders or a specialized order of your own before running this programme.

The "PRINT DETAILS Sheet" like all other sheets within the BRIDGES4. Xls file once run and saved will remain intact and can be viewed at any time. If you have described the bridge well within the Sub Asset Section and listed all of the required works for the structure then the single A4 sheet that covers each individual bridge provides a very useful summary for report purposes etc.

For the second and subsequent survey of your bridge assets you could use a print out in this format as a template to be amended on site during the second inspection. The sheet has no direct menu of its own and can be run from item 5 of the "Run Reports" level of the Bridges 4 menu.

14 CAPITAL WORKS RECORD Sheet

This sheet provides a location for the recording and storage of any works that have been undertaken on the bridge assets. The sheet is titled the capital works record sheet but there is no problem in the inclusion of major maintenance items within the sheet.

This sheet along with the BR MASTER Sheet, the BR CODES Sheet and the Disposals sheet stores permanent asset information. The data within the sheet is built up over time and becomes a permanent record of all major expenditure activity on your bridge assets. Clearly this will provide a great benefit in decision-making associated with your bridge replacement program.

The sheet has its own menu at level 10 of the Bridges 4 Menu with 5 program items attached as detailed below.

1. Add new data entry line

2. Remove Last line (Row 22)

3. Sort Sheet by Road Alphabetic Order

4. Sort Sheet by Date of Capital Works

5. Format Sheet for A4 Printing

To add a new data entry line to the sheet, click into the row within the Br Master Sheet of the bridge you want to copy. Then activate menu item 1 above. This action will copy the details of the selected bridge to the "Capital Works Record" Sheet. Following that action you then fill in the details within the sheet relating to the capital works that have been undertaken.

The second level of the menu provides a means of removing a new record if a mistake was made in creating it. The last 3 items are similar to other sheets.

15 Disposals Sheet

The Disposals Sheet is provided as a location for the storage of old data that has been superseded by reconstruction of redundancy. To add a record to the sheet click on the bridge you want entered here within the BR MASTER SHEET and then see Item 11 on the BRIDGES4 Menu. The bridge is not removed from the BR MASTER SHEET as you may wish to maintain it there if it is to be replaced. But you can delete the row from the BR MASTER SHEET if Required.

Once the record is created you should enter the details of the disposal within Columns IE to IO. The sheet can be used for two purposes. It can act as an accounting record for the value of the bridge that was written off at the time of disposal. It can also be used to engineering store details of the old structure once replaced. The sheet has its own menu level on the Bridges 4 menu at level 11 Disposals Sheet with the following program items.

1. Add a new record to Disposals Sheet

2. Remove last record on Row 22

3. Reset total and average figures on Row 14

4. Format Sheet for A4 Printing

5. Copy Row 11 Formats to whole Sheet

You can create a new record as described above and remove the last created record via menu item 2 above. The sheet has total and average figures on row 14 that can be updated when new records are added via Menu item 3. Item 4 formats for A4 printing while item 5 allows you format all data within the sheet as per the hidden copy block format within row 11.

16   Existing Condition   Sheet

The existing condition sheet provided a series of 3 graphs which detail the condition distribution of the asset set. There is no program associated with the sheet it is simply a record of the overall condition distribution for the asset set. If uploading data to the Moloney Model All.xls File directly, then this is the information that is extracted.

17   Bridge Replacement Schedule by Age   Sheet

This sheet provides a graphical representation of the two distributions within the Br Master Sheet associated with the year of construction (Column T) and the proposed year of replacement (Column V). There are no further program options within the sheet and no sheet menu item. The sheet is updated from item 8 at level 3 Run Reports of the Bridges 4 Menu.

There is also provision on the sheet within Cell M5 for two valuation options. One has the replacement valuation based upon an identical Structure (Place "S" within Cell M5). The other adopts the valuation for the proposed replacement configuration (Place "P" within Cell M5). You will recall that columns AH – AL on the "Br Master Sheet" enable you to specify a different bridge configuration for the proposed replacement structure. If no entries are made here than the program assumes that the bridge will be replaced with a structure of the same configuration.

From an asset management point of view it would generally be better to look at the cost structure for the proposed replacement configuration rather than assuming that the bridge will be replaced with the same structure. However, it was felt that for some accounting functions modelling the replacements with identical structures could be useful.

18   User Defined Notes   Sheet

A sheet provided for the storage of unique data associated with your assets. The format of the sheet can be amended to suite and this sheet including any formatting forms part of the backup system so your data will not be lost if you update to a new program file.

19   Program Amendments Sheet

A sheet that contains a record of the program amendments that have been undertaken within the file.

20 Notes on File Sheet

This sheet contains some very brief notes covering the functions of the Bridges4 file. The sheet is provided as a quick reference and simple guide to those who tend, like myself, launch into the program without reference to the manual. The notes are brief but will provide an overview of the operation of the program

21 Standard Excel Operations within the Program

There are a number of standard Excel operations that are very useful in dealing with data within the file for gaining specific reports and information. Some of the operations that require a degree of manual setting up have been automated for ease of operation. Items such as the setting up of AutoFilters, the Freezing of Panes, selection of all data and the protection of sheets have all been programmed in. These items are easy to set up manually but it has been found that they are items that are used frequently and there is a considerable time saving in having them accessed via a programme short cut key.

This section contains a description of the pre programmed Excel functions as well as some other very useful excel operations.

17.1 Pre Programmed Standard Excel Functions.

The Following Standard Excel functions have been programmed in and can be accessed from the Bridges 4 drop down menu at level 12 Common Functions.

1.	Protect the Active Work sheet	Ctrl Shift P
2.	Remove protection from the active Sheet	Ctrl Shift U
3.	Set up AutoFilters on Active Sheet	Ctrl e
4.	Remove the Autofilter from the Active Sheet	Ctrl r
5.	Freeze the panes to view the Data	Ctrl Shift E
6.	Remove the freeze panes	Ctrl Shift R
7.	Select all Data for a Manual sort	Ctrl x
8.	Display Hidden Copy Block	Ctrl h
9.	Hide Hidden Copy Block	Ctrl Shift H
10.	Show all Columns on Active Sheet	Ctrl Shift D

17.1.1 Protecting the Sheet

Protection of the active sheet is often placed on during the running of a program. This is done to avoid the unwanted loss of data within the BR Master Sheet in particular and to a lesser extent within other reports. As you use the programme you will often find the need to place on or remove protection and the short cut key operations will greatly assist.

17.1.2 AutoFilters

If you have not used the Autofilter function within Excel then you are missing out on what is perhaps the most powerful manual tool within the system. The AutoFilters allow you to select for display any one or more items or types of items within a Column by hiding the rows that do not contain the selected data. For

example you may wish to isolate all of the bridges with Timber stringers that are over condition 6. This is achieved by following the procedure below:

- Go to the "**Br Master Sheet**" and Set up the AutoFilters by Pressing "**Ctrl e**"

- Go to column DW and click into the Autofilter arrow

- From the drop down menu that appears choose the code for Timber Stringers "T"

- Now only bridges with timber stringers will be displayed.

- Go to Column DX and click onto the Autofilter Arrow

- Choose "**Custom**"

- Then Choose the options "**is greater than**" and the value 6

- Now only bridges with timber stringers that are in a condition greater than 6 will be displayed.

You may continue adding as many conditions and constraints as you wish. This facility is a very powerful tool and can be used on all tables within the file simply by selecting "Ctrl e". When you have finished the process or wish to set up another type of filter it is a good idea to remove the filters to ensure that all of the selected criteria have been removed before you attempt to set up another filter. To remove the Autofilter select "**Ctrl r**". You may also use the drop down menu command **BRIDGES4 / COMMON FUNCTIONS / Set up Auto filters on Active Sheet** as outlined above. Alternatively you could use the standard excel set up on the data menu but this is a little messy.

17.1.3 Freeze Panes

When dealing with a large spreadsheet, it is often very handy to have the column headings remain in view while you scroll through the data. Excel has a function called **Freeze Panes,** which allows you to do this. You can freeze the column Headings as well as the row or rows that you want to remain within view as you scroll through the data set. The Excel function can be accessed manually from the drop down menu **WINDOWN / FREEZE PANES**. The panes will be frozen at the point at which the active cell is highlighted.

Within the Bridges4 File this function has been programmed in and can be accessed via the drop down menu or accessed via the Short cut keys **Ctrl Shift E** to Freeze the Panes and **Ctrl Shift R** to remove the freeze. If the location of the programmed freeze is not to you liking you will need to place it on manually.

Note also that when the Panes are frozen via the inbuilt programme the totals summary row on row 14 also remains visible. This allows you to view the sheet totals while scrolling and is particularly useful in conjunction with the AutoFilters where the total figures reflect only the total and average figures for the filtered data displayed.

17.1.4 Select All Data Function

Often when seeking outcomes from the data set within the File you will need to undertake a Manual sort of the data. Excel allows you to sort data with three levels of criteria. The program that selects all of the data below the headings within the active sheet has been included because it is an often used function within the various sheets. The operation should only be used on a table spreadsheet type sheet.

To use this function you select "**Ctrl x**". Then with all of the data highlighted you choose from the Drop down Menu **DATA / SORT / Then pick the three criteria that you want**.

17.1.5 Display Hidden Copy Block

Row No 11 of the Br Master Sheet is a row of details containing the recommended formatting for the body of the sheet as well as all formulae that are used within the shaded cells of the Sheet. To display the hidden copy block use the short cut keys **Ctrl h** or click into the menu item on the Common Functions menu. To hide the block use **Ctrl Shift H**.

The formulae within the hidden copy block may be amended but you should be very careful about undertaking such an operation and perhaps contact us for advice on the program implications before proceeding. It is recommended that the rows 10 - 12 be hidden unless you intend to examine or amend the hidden formulae or formatting. If you make amendments to the hidden copy block formulae these can be applied to the body of the database via the drop down menu by choosing 1C Master Sheet Formats Item 1.

17.1.6 Common Functions – Display all Columns of the Active Sheet

All of the report sheets within the file are formatted within the program ready for A4 printing. However, there is often far more information within the report than can be displayed within an A4 format. So quite often when using the program you will want to examine all of the available information within a particular report. This could be done manually within excel but has been programmed in as a common function to assist regular users of the program.

18 Other Program Information

There are a few other functions within the programme that are worthy of mention.

18.1 The Total & Average Figures on Row No. 14

Row No. 14 has been set aside to record the total and average figures for the displayed data within each sheet. The figures are derived via what are known as Subtotal formulae. These figures provide the sub total values for the displayed data at any time. This is a very useful function in conjunction with the AutoFilters as they display the figures for the filtered and not the whole data set.

The formulae that generate the Total and Average figures within Row 14 can be reset from the Drop down Menu. See 1A Master Sheet General Item 4

18.2 Adding and Removing lines of data entry

It is recommended that new lines for data entry be generated using the "**Ctrl a**" short cut key command or the drop down menu. To remove lines of data entry first remove the protection from the **"Br Master Sheet"** and then highlight the number of the Row that you wish to remove and from the drop down menu choose

EDIT / DELETE

CAUTION: be sure that you want to delete data before you undertake this task as once it is deleted and the file saved it will be gone for good. Refer to the section above on the "Disposals Sheet for the recommended details relating to the storage of deleted rows or Disposed of Assets.

18.3 Running Reports

Reports can be run from the drop down menu. **BRIDGES4 / 3. RUN REPORTS / 1 -12 options.** The reports can be run in total by choosing Run all Programme Reports. This command will run all reports within the Bridges4.xls file. There are two reports within the File that can take a long time to run. These are the PROP WORKS Sheet and the PRINT DETAILS Sheet. Both of these sheets require the copying of individual lines and segments of lines of data to the new reports. Option **1A. Run All Programmes other than Prop Works and Print Details** has been provided so that all other programmes can be run from the one command independent of these two slower reports.

If you need these reports then they can be run separately later, or you could choose option No.1 and run all reports within the file. All of the reports can be run on an individual basis if required.

18.4   Programmed Sort Functions

There are a number of standard sorts programmed in for all of the Report sheets as well as the "Br Master Sheet". These have been dealt with above but to examine the options have a look at the BRIDGE4 drop down menu options for each sheet.

18.5   Hiding Columns that are not used:

Often there will be columns that you will not be using or do not wish to view. This can be the case within all sheets. For example within the "Br Master Sheet" during the Data entry process it is a good idea to format the column sequence to replicate the Data entry sheet as closely as possible. This can be done by hiding the columns that are not required.

To hide a column or a number of columns you use the Excel standard tools. Click onto the heading letter of the column that you wish to hide. This will highlight the column in black. Then click onto the **Format Menu** at the top of the sheet followed by **Column** and **Hide**. This will hide the column or columns that you have highlighted. To bring back the hidden columns, highlight either side of the missing column by clicking onto the column header letter and dragging. Then click onto **Format, Column and Unhide**. Or use the Ctrl Shift D command as detailed in 17.1.6 above.

18.5   Further Assistance and Trouble Shooting

The **Bridges4. Xls** program is relatively trouble free, but if you do have problems then please contact us and we will endeavour to attend to your concern immediately. We want the programme to work for you not to have you working for the program, so if you run into problems and you are a registered user then please do not hesitate to contact us.

Two small things we would ask you to check first though. Have you run the Data Validation program and fixed all errors. If undertaking operations that require the opening of other Moloney Files Did you open the file from within Excel off the File Menu.

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