DRAINAGE DESIGN MANAGEMENT SYSTEM FOR WINDOWS

VERSION 5.3.0

TUTORIAL # 9

CREATING A PROJECT TO EVALUATE THE IMPACT OF LAND USE CHANGES

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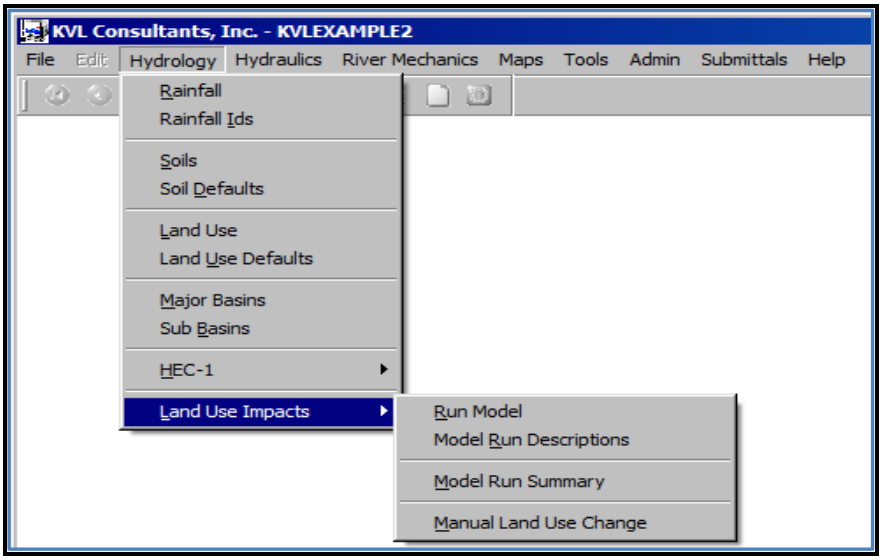
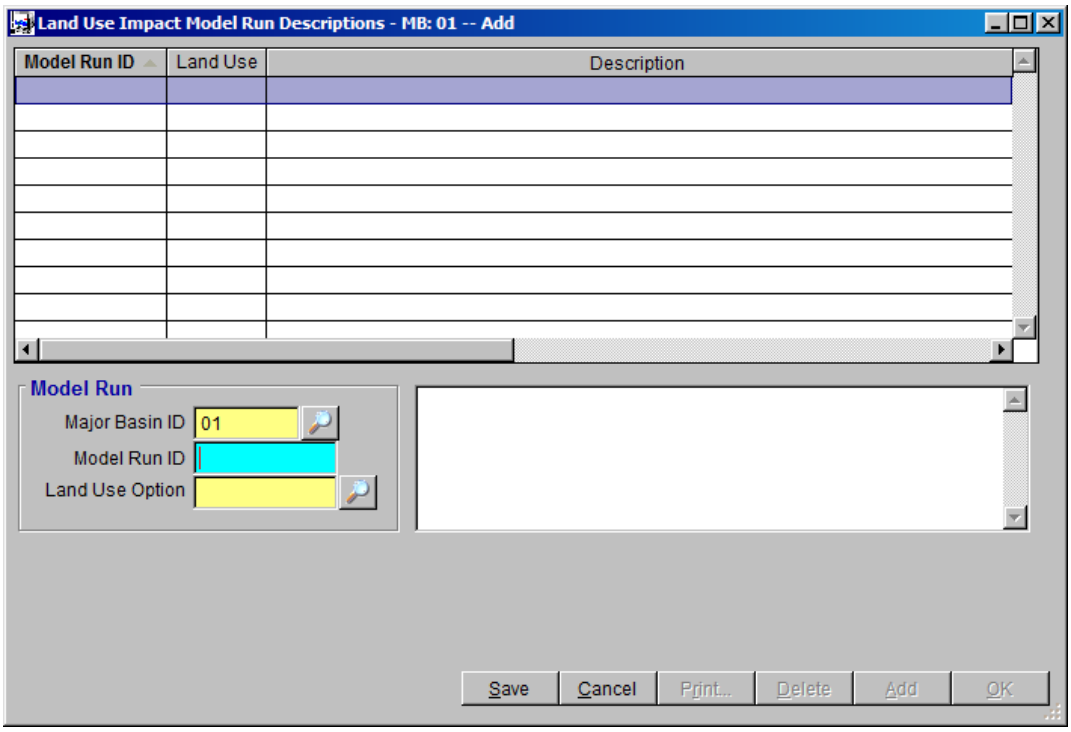
1.0 INTRODUCTION

This tutorial provides a working example to determine the impact of changes in land use data. There are two methods that can be used. The first method is to have a second Land Use GIS map and the second method is to modify the Land Use manually for a particular sub basin. For this tutorial, the **KVLEXAMPLE2** project will be used. The development of the basic HEC-1 model has been described in other tutorials. This tutorial is to showcase the use of the **Land Use Impacts** feature of the program (***Hydrology ➔ Land Use Impacts***). The menu items for the **Land Use Impacts** are as follows:



2.0 CREATE A MODEL RUN DESCRIPTION

Open the **LAND USE IMPACT MODEL RUN DESCRIPTION** form (***Hydrology ➔ Land Use Impacts ➔ Model Run Descriptions***), to create a **Model Run Description.**

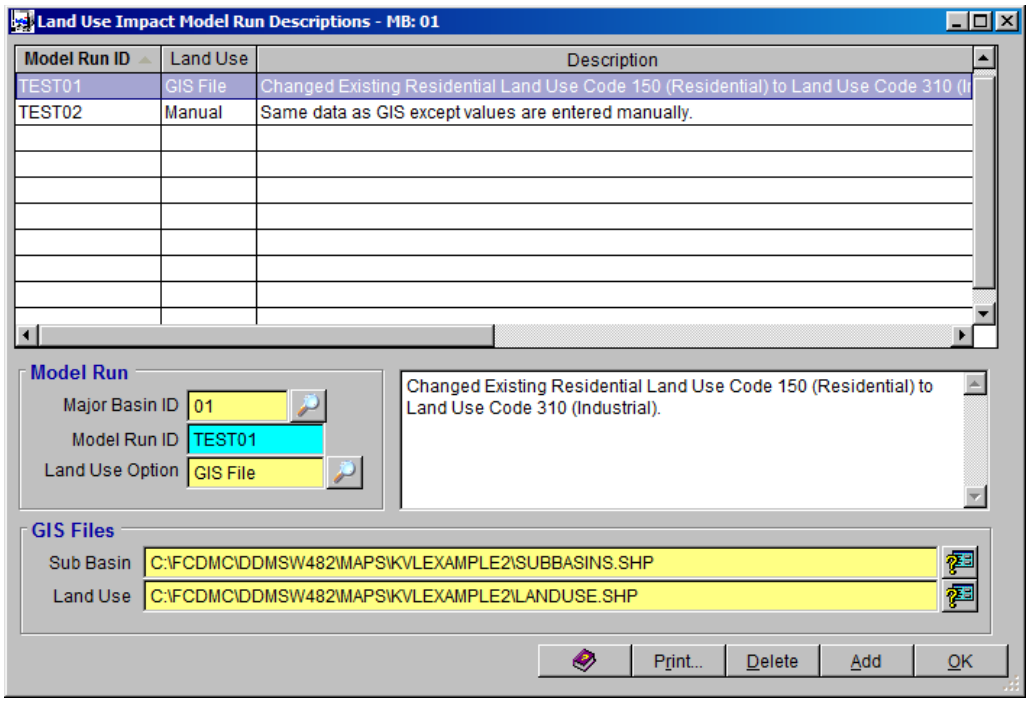


For each model run it is necessary to create a **Model Run ID**. In this tutorial, there will be two (2) model runs to be made. One run involves the use of a GIS shape file and the second is one that involves the manual modification of the same land use data.

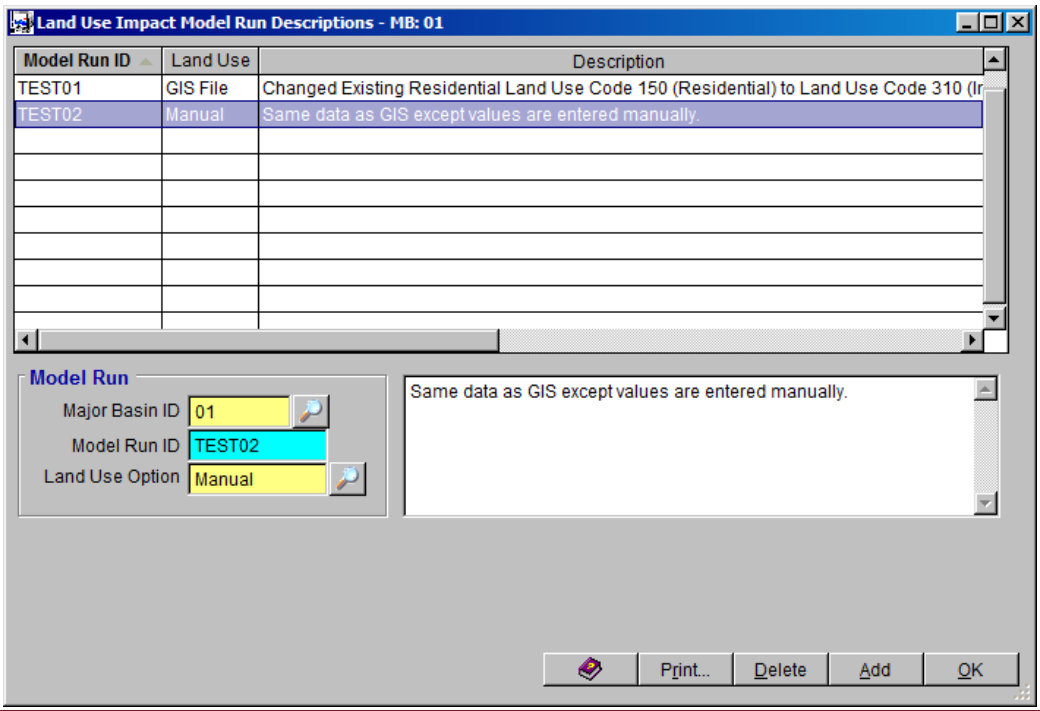
Enter a unique **Model Run ID** and select from the dropdown list which **Land Use Data Option** is used (*GIS File* or *Manual*). If a model run uses the *GIS File*, it is necessary to develop the **Sub Basin** and **Land Use** shape files. The change in **Land Use** dataset from existing condition to future developed conditions should effect a change in the hydrologic model results such as the magnitude of flows.

On the **LAND USE IMPACT MODEL RUN DESCRIPTION** form (***Hydrology ➔ Land Use Impacts ➔ Model Run Descriptions***), enter the following data:

NO.	DATA FIELD	ENTRIES
1	**Model Run ID**	TEST01
	Land Use Option	GIS File
	Land Use Description	Changed Existing Land Use Code 150 (Residential) to Land Use Code 310 (Industrial)
	Sub Basin GIS Files	C:\FCDMC\DDMSW482\MAPS\KVLEXAMPLE2\ SUBBASINS.SHP
	Land Use GIS Files	C:\FCDMC\DDMSW482\MAPS\KVLEXAMPLE2\ LANDUSE.SHP



NO.	DATA FIELD	ENTRIES
2	**Model Run ID**	TEST02
	Land Use Option	Manual
	Land Use Description	Same data as GIS except values are entered manually.

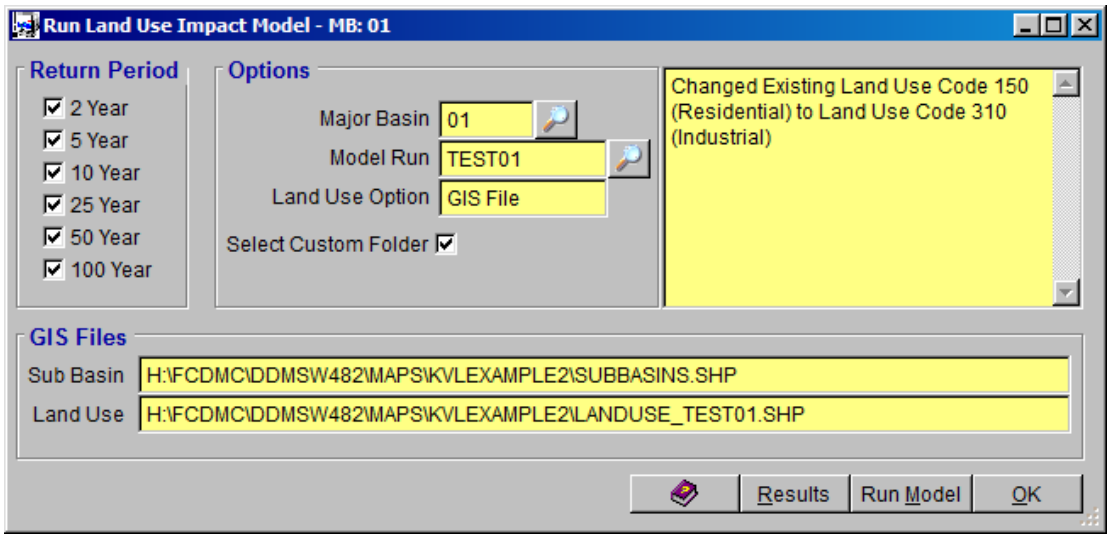


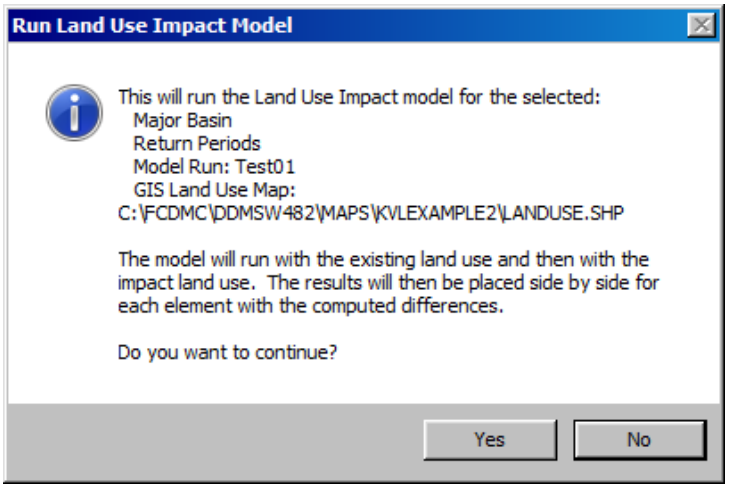
After entering the data, click the ***'OK'*** button to close the form.

3.0 MODEL RUN USING GIS DATA

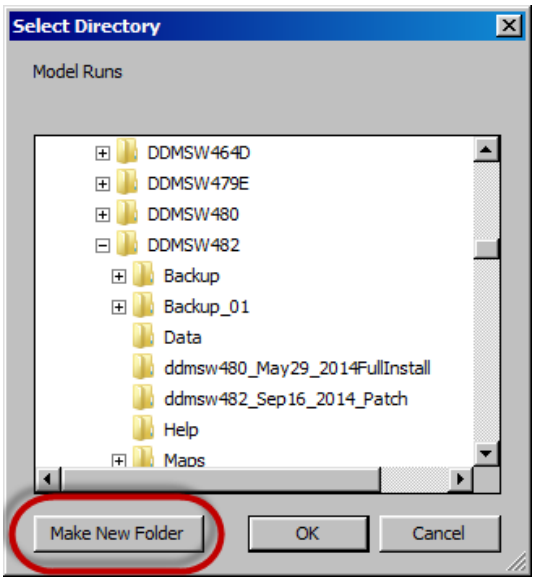
On the **RUN LAND USE IMPACT MODEL** form (***Hydrology ➔ Land Use Impacts ➔ Run Model***), select *'TEST01'* for the **Model Run** and check all the checkboxes for return periods (**2 Year, 5 Year, 10 Year, 25 Year, 50 Year,** and **100 Year**) to be modeled. When *'TEST01'* is selected for the **Model Run**, the **Land Use Option** and **Description** textbox fields are automatically populated with the data entered earlier (i.e., *'GIS File'*, and *'Changed Existing Land Use Code 150 (Residential) to Land Use Code 310 (Industrial)').*

If it is preferred to have the model runs saved in a folder (other than the folder established in ***'File ➔ Project Paths'***), then check ***'Select Custom Folder'*** check box. Before running the **Land Use Impact Model**, it is assumed that the original model has been run for the same selected return periods. Finally, click the ***'Run Model'*** button to execute the program for the dataset. Click ***'Yes'*** to continue.





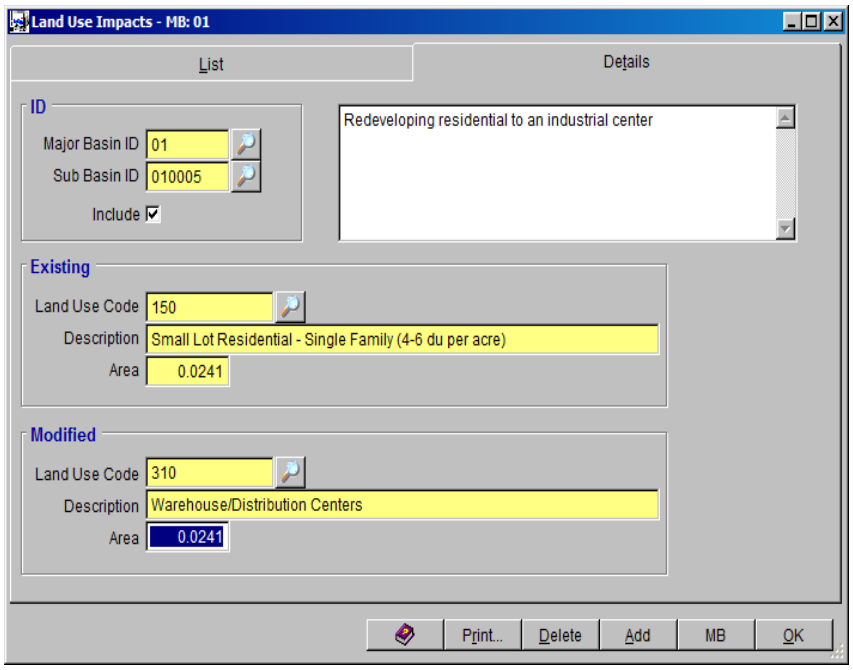
If the **'*Select Custom Folder'*** checkbox is checked, you need to create a folder (click ***'Make New Folder'*** button) for storing model run results or if a folder already exists, to navigate to the folder.



After the first land use dataset is successfully run and model run results were saved at a preferred folder location, click the ***'OK'*** button to close the **RUN LAND USE IMPACT MODEL** form.

4.0 MODEL RUN USING MANUAL DATA

On the **LAND USE IMPACTS** form (***Hydrology ➔ Land Use Impacts ➔ Manual Land Use Change***), select the **Details** tab.



(a) Select the **Sub Basin** (start with Sub Basin ID '*010005*') to have the land use modified.

(b) Check the ***'Include'*** checkbox to include this record in the analysis

(c) Select the **Existing Land Use Code** to be modified (select *'150'*)

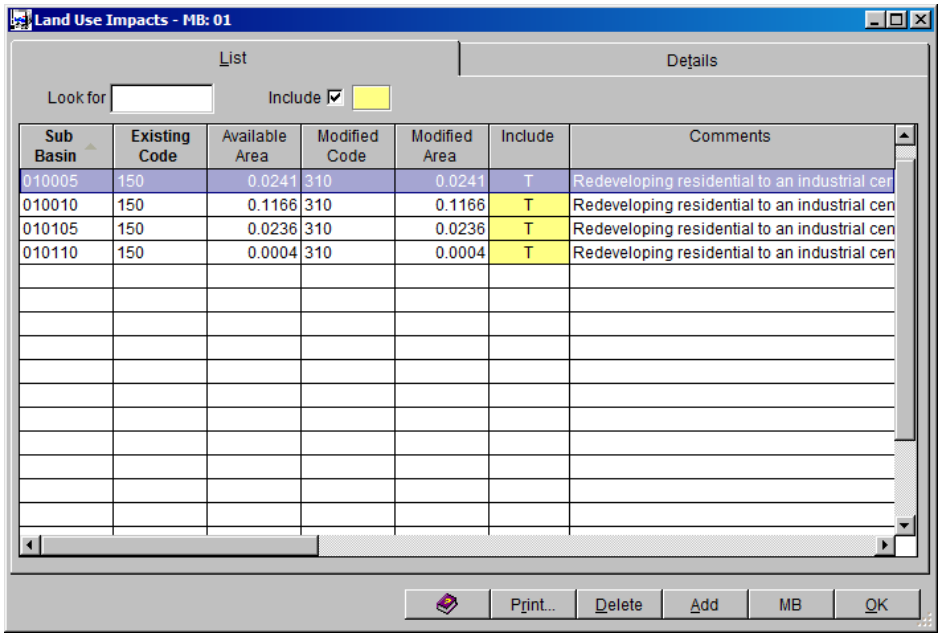
(d) Select the **Modified Land Use Code** (select *'310'*)

(e) Enter the Area for this land use that you want to change. In this case the entire area is used (Enter *'0.0241'*)

(f) Enter a **Description** for the change (*'Redeveloping residential to an industrial center*).

(g) Repeat steps (a) to (f) for all Sub Basins where Land Use Code *'150'* are modified to Land Use Code '310'.

(h) After going through all the Sub Basins, click ***'OK'*** to exit the **LAND USE IMPACTS** form.



To run the model *('TEST02')*, use the same steps that were used for running *'TEST01'*.

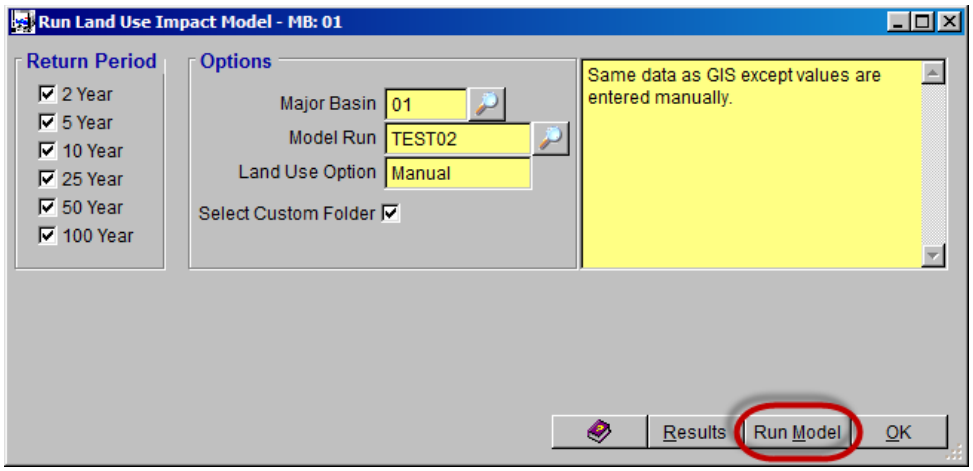
(1) Open the **RUN LAND USE IMPACT MODEL** form (***Hydrology ➔ Land Use Impacts ➔ Run Model***)

(2) Check all the checkboxes for the Return Period events (**2 Year, 5 Year, 10 Year, 25 Year, 50 Year,** and **100 Year**)

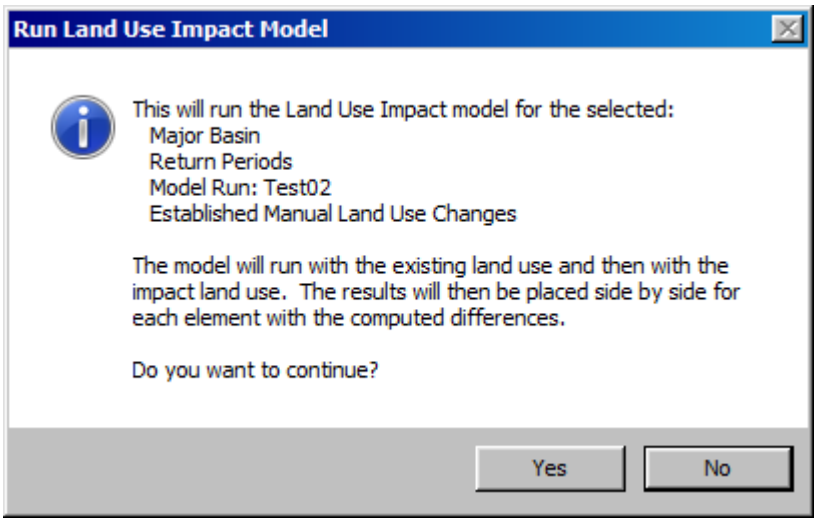
(3) Make sure that 'TEST02' is selected for the Model Run

(4) Check *'Select Custom Folder'* check box to save results in a custom folder

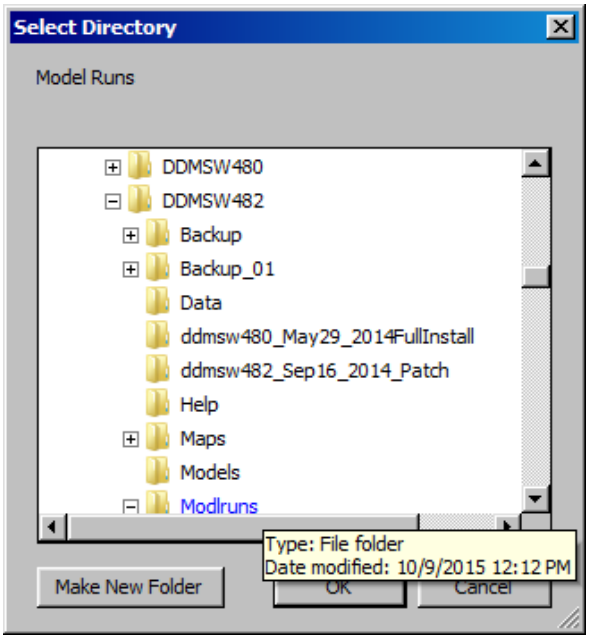
(5) Click the ***'Run Model'*** button.



(6) Click ***'Yes'*** to run the Land Use Impact model.



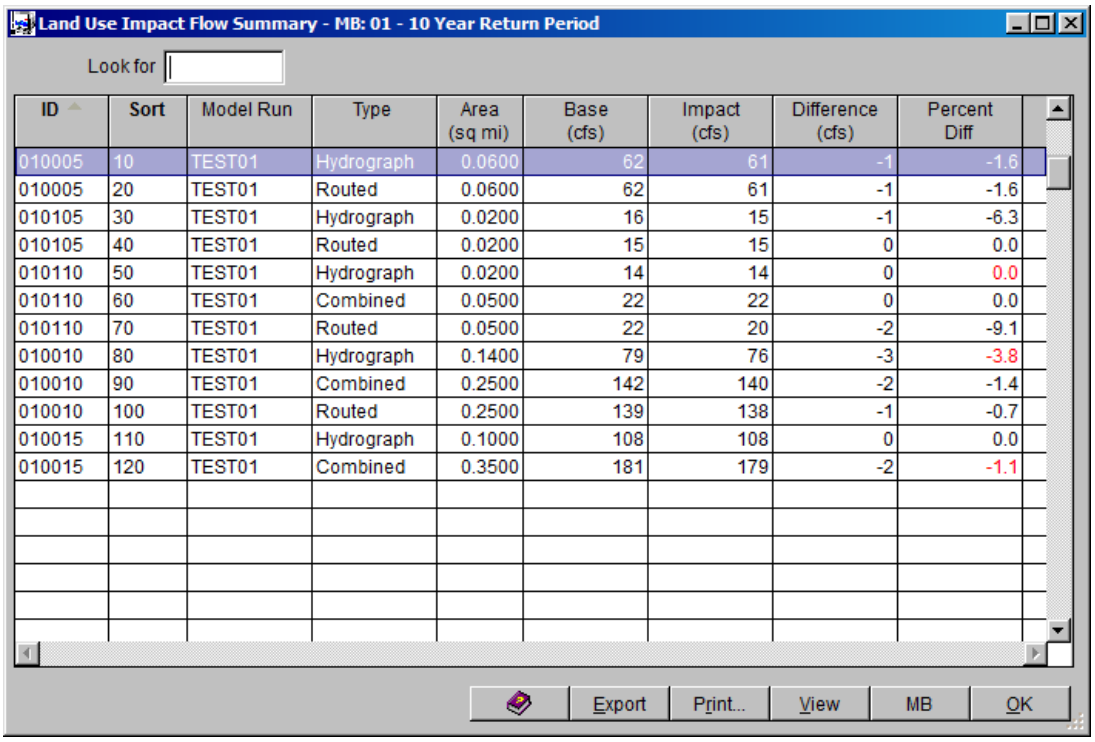
(7) Select the folder where to save model run results.



(8) Click ***'OK'*** to continue the run. The **SELECT DIRECTORY** form closes when the execution is finished..

5.0 LAND USE IMPACT MODEL RUN SUMMARY

Open the **LAND USE IMPACT FLOW SUMMARY** form (***Hydrology ➔ Land Use Impacts ➔ Model Run Summary***) to show the Land Use Change Impact.

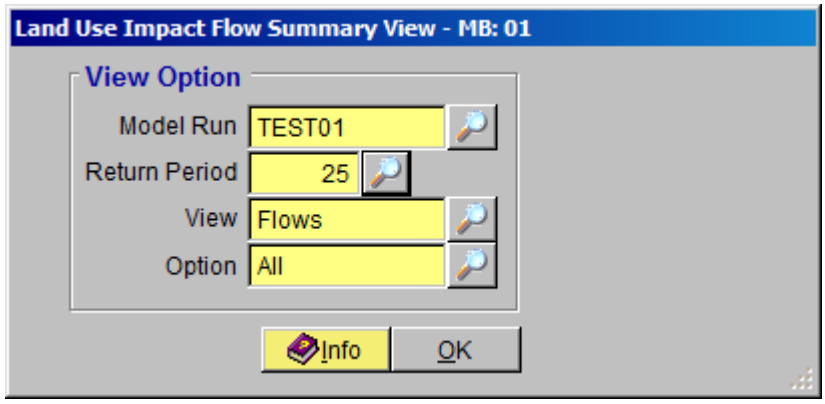


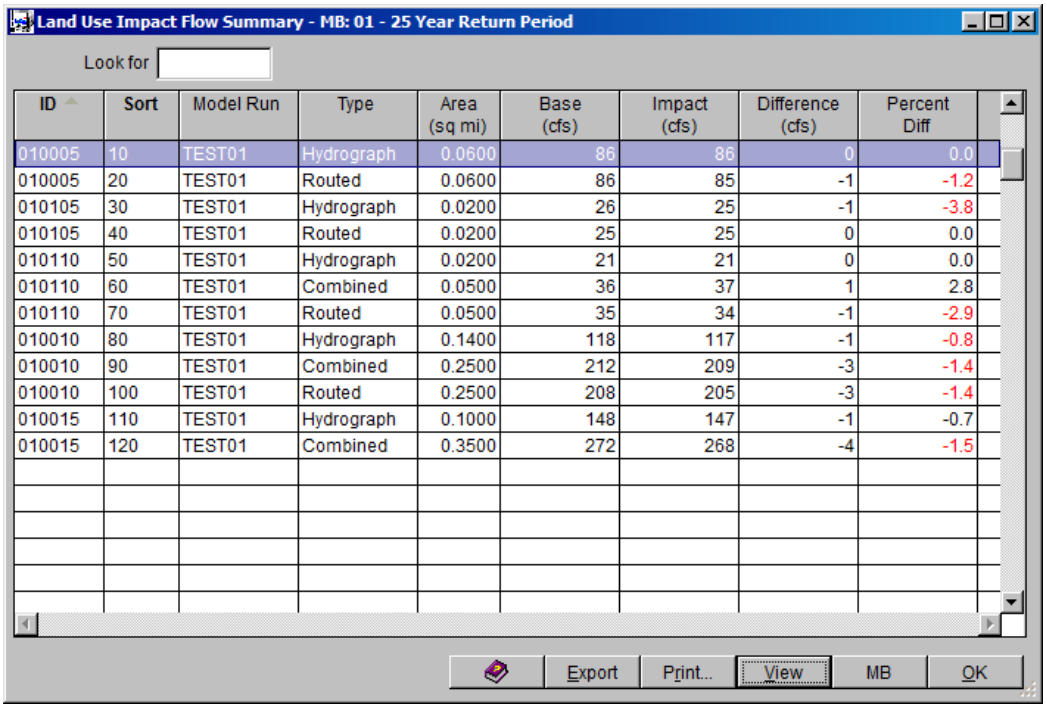
ID	Sort	Model Run	Type	Area (sq mi)	Base (cfs)	Impact (cfs)	Difference (cfs)	Percent Diff
010005	10	TEST01	Hydrograph	0.0600	62	61	-1	-1.6
010005	20	TEST01	Routed	0.0600	62	61	-1	-1.6
010105	30	TEST01	Hydrograph	0.0200	16	15	-1	-6.3
010105	40	TEST01	Routed	0.0200	15	15	0	0.0
010110	50	TEST01	Hydrograph	0.0200	14	14	0	0.0
010110	60	TEST01	Combined	0.0500	22	22	0	0.0
010110	70	TEST01	Routed	0.0500	22	20	-2	-9.1
010010	80	TEST01	Hydrograph	0.1400	79	76	-3	-3.8
010010	90	TEST01	Combined	0.2500	142	140	-2	-1.4
010010	100	TEST01	Routed	0.2500	139	138	-1	-0.7
010015	110	TEST01	Hydrograph	0.1000	108	108	0	0.0
010015	120	TEST01	Combined	0.3500	181	179	-2	-1.1

Alternatively, the same summary results can be accessed from the **RUN LAND**

USE IMPACT MODEL form clicking the ***'Results'*** button.

To check the summary results for other return periods, change the **Return Period** on the **MODEL VIEW** form (***Hydrology ➔ Land Use Impacts ➔ Model Run Summary➔View***) using the Selector button. Click ***'OK'*** to close the form.





ID	Sort	Model Run	Type	Area (sq mi)	Base (cfs)	Impact (cfs)	Difference (cfs)	Percent Diff
010005	10	TEST01	Hydrograph	0.0600	86	86	0	0.0
010005	20	TEST01	Routed	0.0600	86	85	-1	-1.2
010105	30	TEST01	Hydrograph	0.0200	26	25	-1	-3.8
010105	40	TEST01	Routed	0.0200	25	25	0	0.0
010110	50	TEST01	Hydrograph	0.0200	21	21	0	0.0
010110	60	TEST01	Combined	0.0500	36	37	1	2.8
010110	70	TEST01	Routed	0.0500	35	34	-1	-2.9
010010	80	TEST01	Hydrograph	0.1400	118	117	-1	-0.8
010010	90	TEST01	Combined	0.2500	212	209	-3	-1.4
010010	100	TEST01	Routed	0.2500	208	205	-3	-1.4
010015	110	TEST01	Hydrograph	0.1000	148	147	-1	-0.7
010015	120	TEST01	Combined	0.3500	272	268	-4	-1.5

This concludes this tutorial.