

Poster



The Model Builder for City Park Using ArcGis

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Abstract

The continued development of industrial sector in Indonesia has caused accelerating the emergence of industrial buildings. The existence of buildings industry in addition to providing a positive impact will also affect the potential, conditions, and quality of natural resources and environment within length can lead to potential and environmental quality decreases when utilization and resource management for the industry is not wise, then wisdom that must be pursued is to maintain and enhance the development of industries that can pay attention to the potential and environmental quality so that efforts to control and prevention of environmental damage can be localized (Susilo, 1998).

Greening Urban is plant as much in home or environment around the home or the road edge, whether it is shaped tree, bush, shrub, grass or other ground cover as green open space. Base on function of green open space can divide into: Urban Agriculture, City Park and City Forest.

This case study area is Cirebon as urban land Geographically the study area is located at 6 ° 43' LS 108° 34' BT, because Cirebon is also the fourth largest city in the northern region after Jakarta, Surabaya and Semarang.

In this study, we studied about land suitability for city park based to GIS approach. Firstly, we design the spatial builder, secondly, we establish the process of spatial data and their model and finally, we will have the suitable areas for city park.

The objective of this study to be able to use ArcGIS software especially in spatial modeling and model builder which is convert into python language. The Result of application of ArcGIS software especially in spatial modeling and model builder is good to develop land use.

1. INTRODUCTION

1.1. Background

Development of urban region requires the management of spatial planning more effective and efficient to provide optimal benefits, harmonious and sustainable environment. Management must be based on government regulations and laws related to spatial planning in urban areas where the focus is on spatial planning, area limitations, administration, control and ownership of urban land and change utilization of urban land.

Guidance and direction of development and restructuring of the city in detail and systematically in fact it is set in the Spatial Plan. Rate of change of land use is so complicated to be controlled causing a problem in government planning, more problem is rules of government about the planning area that has not happened the community causes the difficulty settings of the sub-sub-division of this land-use planning is a very balanced and orderly.

Greening Urban is plant as much in home or environment around the home or the road edge, whether it is shaped tree, bush, shrub, grass or other ground cover as green open space. Base on function of green open space can divide into: Urban Agriculture, City Park and City Forest.

This case study area is Cirebon as urban land, because Cirebon is also the fourth largest city in the northern region after Jakarta, Surabaya and Semarang. Because of a very strategic location that is at the crossroads between Jakarta, Bandung, and Semarang Cirebon very suitable to make the city and potential for change to city park.

In this paper, we studied about land suitability for city park based to GIS approach. Firstly, we design the spatial builder, secondly, we establish the process of spatial data and their model and finally, we will have the suitable areas for city park.

1.2. Objective

The objective of this study case is to learn how to develop land suitability for city park development using model builder in GIS. The specific objectives of this study are:

- a. To learn how to develop land use planning in spatial model and conceptual of model builder.
- b. To be able to use ArcGIS software especially in spatial modeling and model builder which is convert into python language.

2. METHODOLOGY

2.1 Location

The location of this data is Cirebon areas part of the West Java Province.



Geographically the study area is located at 6 ° 43' LS 108° 34' BT

2.2 Software and Hardware Requirement

There is some hardware and software requirement to run the application, some hardware and software are required as listed below:

- a. Hardware

- Notebook Acer with specification: speed 2.0 Hz, Memory DDR 1 GB, Hardisk 160 GB.
- Printer Epson Stylus CX5500
- GPS Navigation eTrex Version Indonesia with accuracy 5 m
- b. Software
 - Windows XP Professional
 - ArcGis Version 3.3

 - MS Word 2007

3. APPLICATION OF LAND SUITABILITY FOR CITY PARK

3.1 *The Institution and Business Process*

Urban Planning Agency, an institution that runs in the management of environment in order to help the society to get a welfare, safety and high quality of life.

3.2. *Enhancement of Business Process*

The use of GIS application in managing the environment will enhance the analysis output. The spatial view in GIS gives the ability of looking at natural and artificial phenomena based on its locations which related to other locations. GIS application will give result on the information that is needed for further decision making process. The outputs from GIS application are in form of maps that draw the condition of a certain environmental issues. It means that the use of GIS application will enhance the business process automation in generating information of environmental phenomena to help the institution manage environment for the society.

3.3 *Application of case study*

The criteria of this land suitability for city park location as follow; the potential area should be 100 meters to river, the slope of area between 0 – 3% to priority one, 3 – 8% to priority two and 8 – 15% to priority three. The road of train is 500 meters and other road is 100 meters. the vegetation which is shrub, blank land and tegal/lading,

As part of a city park risk assessment, the Environmental Management Consultant was tasked with estimating rivers, roads, slope and land cover layer.

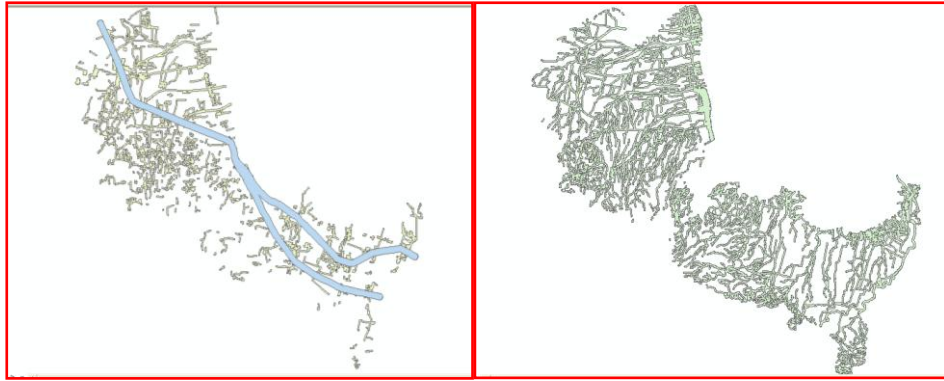


Fig 1. Road for Train and other Road Layer

Fig 2. Buffer River Layer

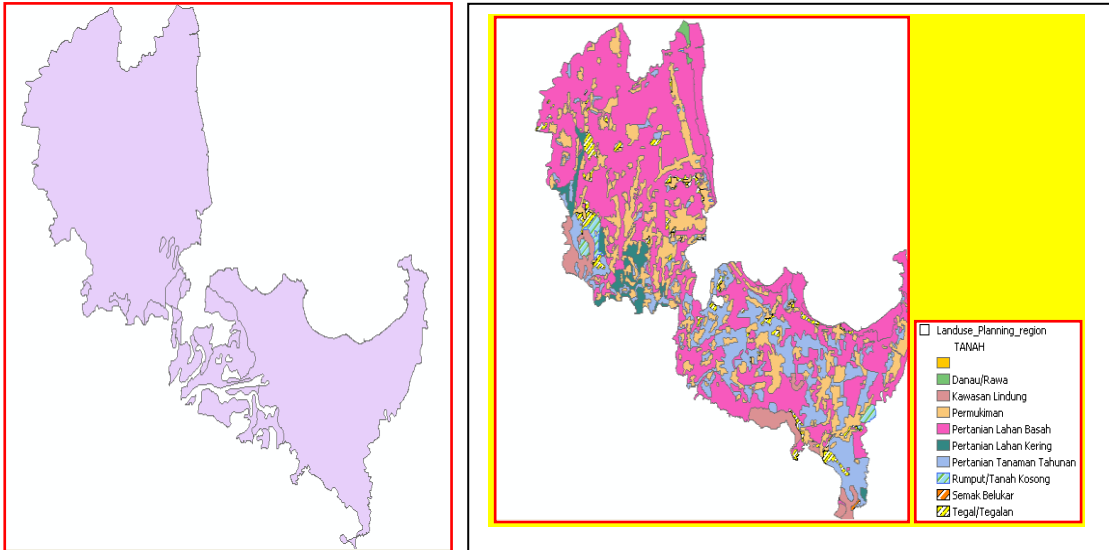


Fig 3. Slope Layer

Fig 4. Land Use Layer

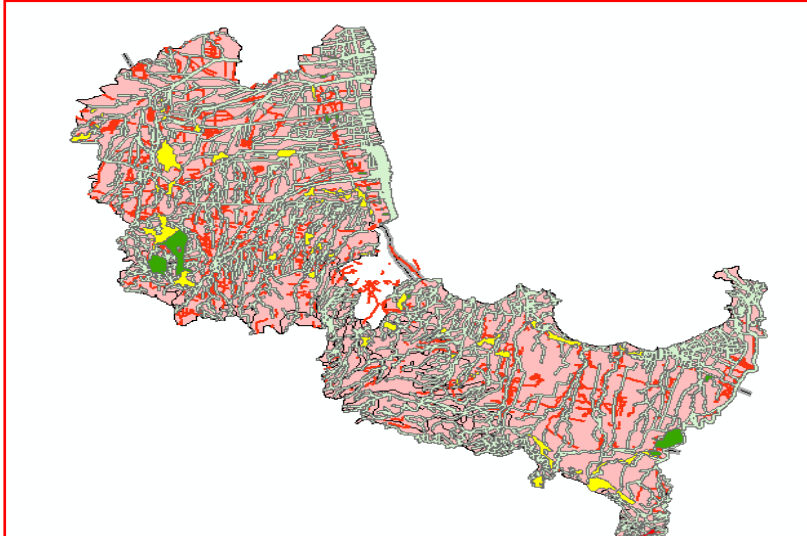


Figure 5. Overlay process as a basic process in analyze spatial data GIS

4. Simple Design of Model Builder

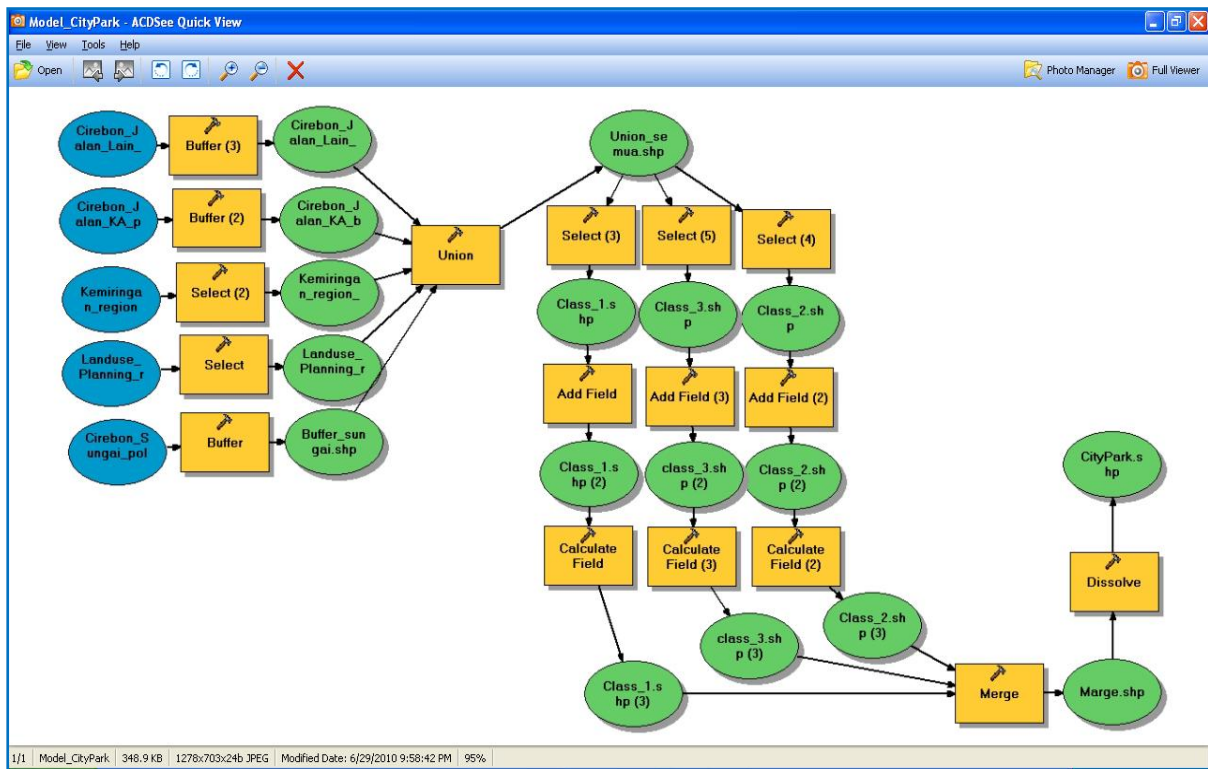


Fig 6. Model Builder Layer

5. The Result of Model Builder

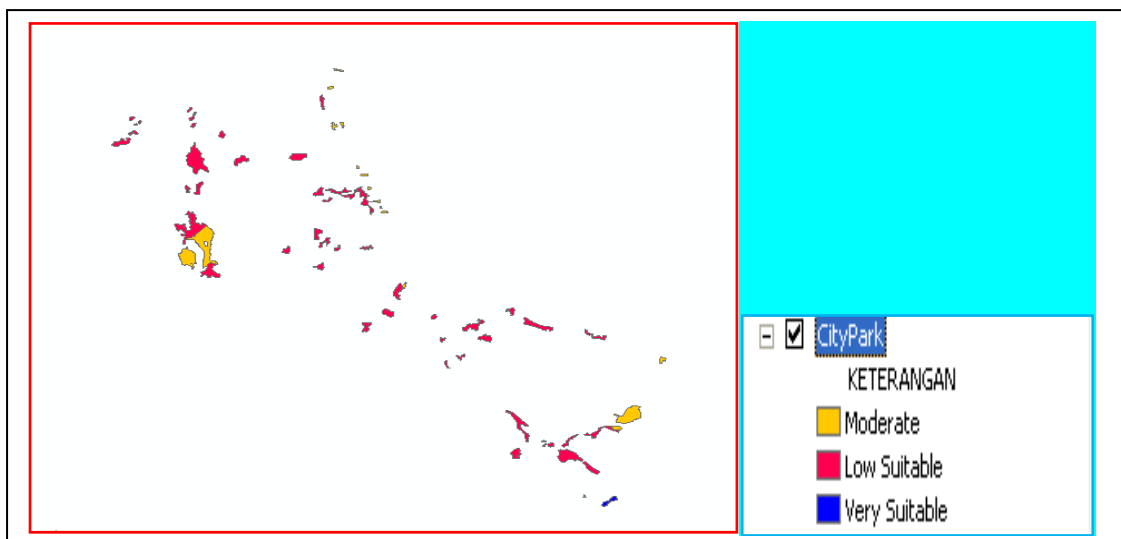


Fig 7. The Priority Area to City Park.

5.1 Export to Python Language

```
6 # -----  
7 # CityPark_phyton.py  
8 # Created on: Tue Jun 29 2010 09:36:52 PM  
9 # (generated by ArcGIS/ModelBuilder)  
10 # -----  
11  
12 # Import system modules  
13 import sys, string, os, arcgisscripting  
14  
15 # Create the Geoprocessor object  
16 gp = arcgisscripting.create()  
17  
18 # Load required toolboxes...  
19 gp.AddToolbox("C:/Program Files/ArcGIS/ArcToolbox/Toolboxes/Data  
Management Tools.tbx")  
20 gp.AddToolbox("C:/Program Files/ArcGIS/ArcToolbox/Toolboxes/Analysis  
Tools.tbx")  
21  
22  
23 # Local variables...  
24 Cirebon_Sungai_polyline = "Cirebon_Sungai_polyline"  
25 Buffer_sungai_shp = "D:\\A-material\\Cirebon\\Buffer_sungai.shp"  
26 Landuse_Planning_region = "Landuse_Planning_region"  
27 Landuse_Planning_region_Sele_shp = "D:\\A-  
material\\Cirebon\\Landuse_Planning_region_Sele.shp"  
28 Kemiringan_region = "Kemiringan_region"  
29 Kemiringan_region_Select_shp = "D:\\A-  
material\\Cirebon\\Kemiringan_region_Select.shp"  
30 Cirebon_Jalan_KA_polyline = "Cirebon_Jalan_KA_polyline"  
31 Cirebon_Jalan_KA_buffer_shp_shp = "D:\\A-  
material\\Cirebon\\Cirebon_Jalan_KA_buffer_shp.shp"  
32 Cirebon_Jalan_Lain_polyline = "Cirebon_Jalan_Lain_polyline"  
33 Cirebon_Jalan_Lain_buffer_shp = "D:\\A-  
material\\Cirebon\\Cirebon_Jalan_Lain_buffer.shp"  
34 Union_semua_shp = "D:\\A-material\\Cirebon\\Union_semua.shp"  
35 Class_1_shp = "D:\\A-material\\Cirebon\\Class_1.shp"  
36 Class_2_shp = "D:\\A-material\\Cirebon\\Class_2.shp"  
37 Class_3_shp = "D:\\A-material\\Cirebon\\class_3.shp"  
38 Class_1_shp_2_ = "D:\\A-material\\Cirebon\\Class_1.shp"  
39 Class_2_shp_2_ = "D:\\A-material\\Cirebon\\Class_2.shp"  
40 class_3_shp_2_ = "D:\\A-material\\Cirebon\\class_3.shp"  
41 Class_1_shp_3_ = "D:\\A-material\\Cirebon\\Class_1.shp"  
42 Class_2_shp_3_ = "D:\\A-material\\Cirebon\\Class_2.shp"  
43 class_3_shp_3_ = "D:\\A-material\\Cirebon\\class_3.shp"  
44 Marge_shp = "D:\\A-material\\Cirebon\\Marge.shp"  
45 CityPark_shp = "D:\\A-material\\Cirebon\\CityPark.shp"  
46  
47 # Process: Buffer...  
48 gp.Buffer_analysis(Cirebon_Sungai_polyline, Buffer_sungai_shp, "100  
Meters", "FULL", "ROUND", "ALL", "")  
49  
50 # Process: Select...
```



```
51 gp.Select_analysis(Landuse_Planning_region,  
Landuse_Planning_region_Sele_shp, "\"TANAH\" = 'Semak Belukar' OR  
\"TANAH\" = 'Rumput/Tanah Kosong' OR \"TANAH\" = 'Tegal/Tegalan'")  
52  
53 # Process: Select (2)...  
54 gp.Select_analysis(Kemiringan_region, Kemiringan_region_Select_shp,  
\"KEMIRINGAN\" = '0 - 3 %' OR \"KEMIRINGAN\" = '3 - 8 %' OR  
\"KEMIRINGAN\" = '8 - 15 %')  
55  
56 # Process: Buffer (2)...  
57 gp.Buffer_analysis(Cirebon_Jalan_KA_polyline,  
Cirebon_Jalan_KA_buffer_shp_shp, "500 Meters", "FULL", "ROUND", "ALL",  
"")  
58  
59 # Process: Buffer (3)...  
60 gp.Buffer_analysis(Cirebon_Jalan_Lain_polyline,  
Cirebon_Jalan_Lain_buffer_shp, "100 Meters", "FULL", "ROUND", "ALL", "")  
61  
62 # Process: Union...  
63 gp.Union_analysis("D:\\A-material\\Cirebon\\Buffer_sungai.shp #;D:\\A-  
material\\Cirebon\\Landuse_Planning_region_Sele.shp #;D:\\A-  
material\\Cirebon\\Kemiringan_region_Select.shp #;D:\\A-  
material\\Cirebon\\Cirebon_Jalan_KA_buffer_shp.shp' #;D:\\A-  
material\\Cirebon\\Cirebon_Jalan_Lain_buffer.shp #", Union_semua_shp,  
"ALL", "", "GAPS")  
64  
65 # Process: Select (3)...  
66 gp.Select_analysis(Union_semua_shp, Class_1_shp, "\"TANAH\" = 'Semak  
Belukar'")  
67  
68 # Process: Add Field...  
69 gp.AddField_management(Class_1_shp, "KETERANGAN", "TEXT", "", "", "50",  
"", "NON_NULLABLE", "NON_REQUIRED", "")  
70  
71 # Process: Calculate Field...  
72 gp.CalculateField_management(Class_1_shp_2_, "KETERANGAN", "\"Very  
Suitable\"", "VB", "")  
73  
74 # Process: Select (4)...  
75 gp.Select_analysis(Union_semua_shp, Class_2_shp, "\"TANAH\" =  
'Rumput/Tanah Kosong'")  
76  
77 # Process: Add Field (2)...  
78 gp.AddField_management(Class_2_shp, "KETERANGAN", "LONG", "50", "", "",  
"", "NON_NULLABLE", "NON_REQUIRED", "")  
79  
80 # Process: Calculate Field (2)...  
81 gp.CalculateField_management(Class_2_shp_2_, "KETERANGAN",  
\"Moderate\"", "VB", "")  
82  
83 # Process: Select (5)...  
84 gp.Select_analysis(Union_semua_shp, Class_3_shp, "\"TANAH\" =  
'Tegal/Tegalan'")  
85  
86 # Process: Add Field (3)...
```

```
87 gp.AddField_management(Class_3_shp, "KETERANGAN", "TEXT", "", "", "50",
88 "", "NON_NULLABLE", "NON_REQUIRED", "")
89 # Process: Calculate Field (3)...
90 gp.CalculateField_management(class_3_shp__2_, "KETERANGAN", "\"Low
Suitable\"", "VB", "")
91
92 # Process: Merge...
93 gp.Merge_management("D:\\A-material\\Cirebon\\Class_1.shp;D:\\A-
material\\Cirebon\\Class_2.shp;D:\\A-material\\Cirebon\\class_3.shp",
Marge_shp, "FID_Buffer FID_Buffer true false false 9 Long 0 9
,First,#,D:\\A-material\\Cirebon\\Class_1.shp,FID_Buffer,-1,-1,D:\\A-
material\\Cirebon\\Class_2.shp,FID_Buffer,-1,-1,D:\\A-
material\\Cirebon\\class_3.shp,FID_Buffer,-1,-1;Id Id true false false 6
Long 0 6 ,First,#,D:\\A-material\\Cirebon\\Class_1.shp,Id,-1,-1,D:\\A-
material\\Cirebon\\Class_2.shp,Id,-1,-1,D:\\A-
material\\Cirebon\\class_3.shp,Id,-1,-1;FID_Kemiri FID_Kemiri true false
false 9 Long 0 9 ,First,#,D:\\A-
material\\Cirebon\\Class_1.shp,FID_Kemiri,-1,-1,D:\\A-
material\\Cirebon\\Class_2.shp,FID_Kemiri,-1,-1,D:\\A-
material\\Cirebon\\class_3.shp,FID_Kemiri,-1,-1;ID_1 ID_1 true false
false 10 Text 0 0 ,First,#,D:\\A-material\\Cirebon\\Class_1.shp,ID_1,-
1,-1,D:\\A-material\\Cirebon\\Class_2.shp,ID_1,-1,-1,D:\\A-
material\\Cirebon\\class_3.shp,ID_1,-1,-1;KEMIRINGAN KEMIRINGAN true
false false 30 Text 0 0 ,First,#,D:\\A-
material\\Cirebon\\Class_1.shp,KEMIRINGAN,-1,-1,D:\\A-
material\\Cirebon\\Class_2.shp,KEMIRINGAN,-1,-1,D:\\A-
material\\Cirebon\\class_3.shp,KEMIRINGAN,-1,-1;SKOR_KEMIR SKOR_KEMIR
true false false 16 Double 0 16 ,First,#,D:\\A-
material\\Cirebon\\Class_1.shp,SKOR_KEMIR,-1,-1,D:\\A-
material\\Cirebon\\Class_2.shp,SKOR_KEMIR,-1,-1,D:\\A-
material\\Cirebon\\class_3.shp,SKOR_KEMIR,-1,-1;FID_Cirebo FID_Cirebo
true false false 9 Long 0 9 ,First,#,D:\\A-
material\\Cirebon\\Class_1.shp,FID_Cirebo,-1,-1,D:\\A-
material\\Cirebon\\Class_2.shp,FID_Cirebo,-1,-1,D:\\A-
material\\Cirebon\\class_3.shp,FID_Cirebo,-1,-1;Id_12 Id_12 true false
false 6 Long 0 6 ,First,#,D:\\A-material\\Cirebon\\Class_1.shp,Id_12,-
1,-1,D:\\A-material\\Cirebon\\Class_2.shp,Id_12,-1,-1,D:\\A-
material\\Cirebon\\class_3.shp,Id_12,-1,-1;FID_Cire_1 FID_Cire_1 true
false false 9 Long 0 9 ,First,#,D:\\A-
material\\Cirebon\\Class_1.shp,FID_Cire_1,-1,-1,D:\\A-
material\\Cirebon\\Class_2.shp,FID_Cire_1,-1,-1,D:\\A-
material\\Cirebon\\class_3.shp,FID_Cire_1,-1,-1;Id_12_13 Id_12_13 true
false false 6 Long 0 6 ,First,#,D:\\A-
material\\Cirebon\\Class_1.shp,Id_12_13,-1,-1,D:\\A-
material\\Cirebon\\Class_2.shp,Id_12_13,-1,-1,D:\\A-
material\\Cirebon\\class_3.shp,Id_12_13,-1,-1;FID_Landus FID_Landus true
false false 9 Long 0 9 ,First,#,D:\\A-
material\\Cirebon\\Class_1.shp,FID_Landus,-1,-1,D:\\A-
material\\Cirebon\\Class_2.shp,FID_Landus,-1,-1,D:\\A-
material\\Cirebon\\class_3.shp,FID_Landus,-1,-1;ID_12_1_14 ID_12_1_14
true false false 10 Text 0 0 ,First,#,D:\\A-
material\\Cirebon\\Class_1.shp,ID_12_1_14,-1,-1,D:\\A-
material\\Cirebon\\Class_2.shp,ID_12_1_14,-1,-1,D:\\A-
material\\Cirebon\\class_3.shp,ID_12_1_14,-1,-1;TANAH TANAH true false
false 50 Text 0 0 ,First,#,D:\\A-material\\Cirebon\\Class_1.shp,TANAH,-
1,-1,D:\\A-material\\Cirebon\\Class_2.shp,TANAH,-1,-1,D:\\A-
material\\Cirebon\\class_3.shp,TANAH,-1,-1;SKOR_LANDU SKOR_LANDU true
false false 16 Double 0 16 ,First,#,D:\\A-
```

```
94 material\\Cirebon\\Class_1.shp, SKOR_LANDU, -1, -1, D:\\A-  
material\\Cirebon\\Class_2.shp, SKOR_LANDU, -1, -1, D:\\A-  
material\\Cirebon\\class_3.shp, SKOR_LANDU, -1, -1; KETERANGAN KETERANGAN  
true false false 50 Text 0 0 , First, #, D:\\A-  
material\\Cirebon\\Class_1.shp, KETERANGAN, -1, -1, D:\\A-  
material\\Cirebon\\Class_2.shp, KETERANGAN, -1, -1, D:\\A-  
material\\Cirebon\\class_3.shp, KETERANGAN, -1, -1")  
95 # Process: Dissolve...  
96 gp.Dissolve_management(Marge_shp, CityPark_shp, "KETERANGAN", "",  
"MULTI_PART")
```

CONCLUSION

1. Use ArcGIS software especially in spatial modeling and model builder is good to develop land use.
2. We can learn the concept about model builder for prediction of same case study.

REFERENCES

- Armaiki, 2010. Practical of Advance GIS. MIT Course unpublished. Bogor Agricultural University.
- Tarigan, S, 2010. Advance of GIS. MIT Course unpublished. Bogor Agricultural University.