CHUKA UNIVERSITY

WORK INSTRUCTION

FOR

GEOGRAPHY PRACTICAL SESSIONS (CU/WI/GEOG/06)

DOCUMENT REVIEW SHEET

The signatures below certify that this Work Instruction (WI) has been reviewed and accepted, and demonstrate that the signatories are aware of all the requirements contained herein and are committed to ensuring their provision.

Name	Signature	Date
Revised By: COD/COORDINATOR		15.1.2018
Controlled By: COD/COORDINATOR		15.1.2018
Approved By: DEAN		15.1.2018

CONTENTS

1.0 AMENDMENT RECORD SHEET

DATE	ISSUE NO.	REVISION NO.	PAGE NO.	SUBJECT OF REVIEW /MODIFICATION	REVISED BY	APPROVED BY
18.3.13	02	00	ALL	Changed Chuka University College to Chuka University and inserted a new Logo	Lecturer	Dean
18.3.13	02	00	ALL	Changed CUC to CU	Lecturer	Dean
18.3.13	02	00	ALL	Changed QMR to MR everywhere it existed	Lecturer	Dean
18.3.13	02	00	ALL	Changed Principal to Vice-Chancellor everywhere it existed	Lecturer	Dean
18.3.13	02	00	ALL	Replaced Quality Management Representative with Management Representative all over the footer	Lecturer	Dean
15.1.2018	03	00	ALL	Changed reference Standard to ISO 9001:2015	COD	ISO M.R.
15.1.2018	03	00	1	Changed revised/controlled by to COD	COD	ISO M.R.

2.0 GENERAL

2.1 Purpose

The purpose of this Work Instruction is to enhance the capability in the development and use of GIS concepts and technology,provide working knowledge required in the acquisition, preparation and management of geospatial data and develop a core of trained GIS personnel who can provide support for GIS projects nationally, internationally and globally

2.2 Scope

This WI applies to those who are engaged in the development and implementation of GIS projects in the public and private sectors, professionals such as Surveyors, Engineers, Planners, Geographers, Agriculturalists and others who are interested in the use, development and management of GIS.

2.3 References

(i) ISO 9001:2015 Clause 4.4.2
(ii) Quality Manual
(iii) Manual for Geographic Information Sysytem.

2.4 Definitions and Abbreviations

Definitions

In addition to the relevant common definitions of terms given in ISO 9000:2005, the following specific definitions shall apply:

Abbreviations

AMR	**=**	Assistant Management Representative
MR	**=**	Management Representative
QMS	**=**	Quality Management System
WI	**=**	Work Instruction
GIS	=	Geographic Information System
GHZ PCs	=	Gigatterz Personal Computers
HP	=	Hewlett Pacard
3D	=	Three dimension
CEO	**=**	Chief Executive Officer
AML	**=**	ARC Macro-Language

2.5 Responsibility

Table 1: Responsibilities and activities in the work instruction for creating a map using arc map

Activity	Responsibility
Preparation for GIS labouratory	GIS lab technician
Giving GIS instructions	GIS instructor
Demonstrating how to draw the map using the arcmap software	GIS instructor
Supervision of students to identify whether they are following the instructions as demostrated .	GIS instructor and GIS lab technician
Acceptance or rejection of the final output as displayed on the computer (which is the map)	GIS instructor
Advice the students on what they are intended to do in order to produce quality output particularly the ones whose work has been rejected	GIS instructor

2.7 Tools and Equipment

1. **ArcGIS Desktop**
   It is available at three functionality levels; ArcView, ArcEditor and ArcInfo. ArcMap for mapping information and works, ArcCatalogue for geodatabase management and ArcToolbox for tools and analysis. Below is a brief overview:

2. **ArcView**
   It is primarily designed for geographic data visualization, query, analysis, basic data management, and cartographic composition and publication

3. **ArcEditor**
   It is primarily designed for geodatabase creation and editing.

4. **ArcInfo**
   It is the most functionally rich product in the ArcGIS product family. It combines all the capabilities of ArcView and ArcEditor with additional geoprocessing, spatial analysis, and surface generation tools. It also includes ArcInfo Workstation (ARC, ARCEDIT, ARCPLOT, AML, etc).

5. **ArcGIS Desktop Extensions**
   It extend the functionality of the core desktop license which are licensed separately from the core license. These are: ArcGIS 3D Analyst, ArcGIS Data Interoperability, ArcGIS Geostatistical Analyst, ArcGIS Network Analyst, ArcGIS Publisher, ArcGIS Schematics,

ArcGIS Spatial Analyst, ArcGIS Survey Analyst, ArcGIS Tracking Analyst, ArcScan for ArcGIS, Maplex for ArcGIS.

6. **Scanners**
Hewlett Packard ScanJet, ALTEK

7. Desktop computers
HP duocore, 3.0GHZ,1Gb harddisk or more, one year warranty

8. Printers
Hewlett Packard LaserJet 4L

9. Cartridges (black and white)

10. Photocopiers and photocopiers papers

11. Tables, chairs and spacious room

2.7 Safety Requirements

1. No food or drinks at the work stations.
2. Save your work often and to a personal location files because files are frequently erased from the hard drives.
3. After working LOG OFF but DO NOT SHUT DOWN the computers
4. Please report any problem or ask for help from the lab technician.
5. Operating and service personnel must have read and understood the operating manual in particular the safety instructions before commencing work.
6. Protection gear for operating and service must be made available and worn at all times.
7. Computer cables should be serviced regularly and carefully fixed.

3.0 INSTRUCTION FOR CREATING A MAP USING ARC MAP

3.1 Checklist

Spacious room: The room should be such that it can accommodate the GIS users, computers, printers and digitizers, paper and maps, as well as for workspace away from the machinery.

Environment: GIS laboratory should have power supplies, tables and chairs, display boards and window blinds. It should be located in a safe and secure place. All the safety precautions should be adhered to as well as on how the students gain entry into and out of the working area.

Networking: The networking system should be accessible and there should be the modalities on how they should be controlled and rationed.

Hardware: Desktop computers

Software: All the ArcGIS software such as arc info, arc view, arc editor (refer to tools and equipment)

Staff: GIS instructor and support staffs have to be in place, they must also be trained and involved in the preparation of the classes they will be called on to supervise.

Source of GIS data: Internet source for digital data, map sheets , Global Positioning System (GPS), Remote Sensing Data and surveying data sources.

3.2 Steps

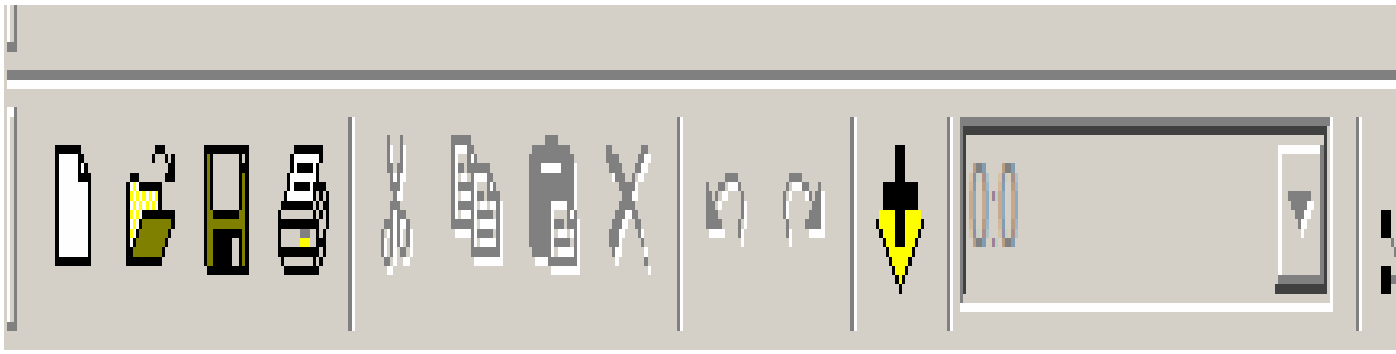
The GIS instructor take the learners through each and every step. This is followed by the demostrations which is done using a computer.

1. To start ArcMap, choose **Start-Programs-ArcGIS-ArcMap** (or the equivalent on your computer). It will take a minute to start.

2. When the first dialog box comes up, make sure that you have selected to start with a *new empty map* and press OK.

3. Choose **View - Toolbars**, and make sure that *Main Menu*, *Standard*, and *Tools* are visible.

4. On the left side of the screen, you should see your *Table of Contents* area - right now it should only say "Layers". If you do not see this separate area, choose **Window - Table of Content.**

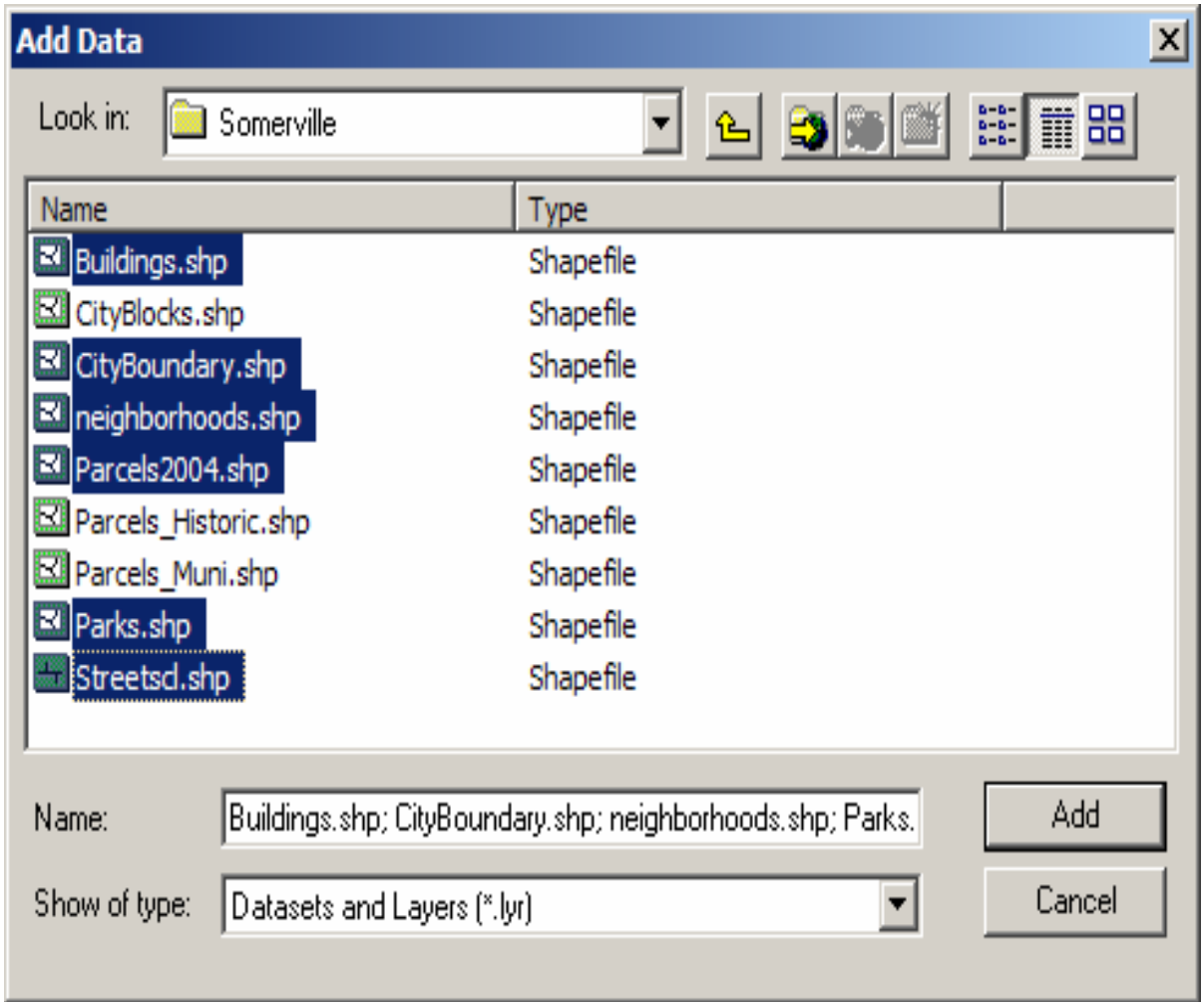


5. Click on the "*plus*" sign (+) to add data to the view pane on the right.The data can be in form of the buildings, city boundary, parks and streets.

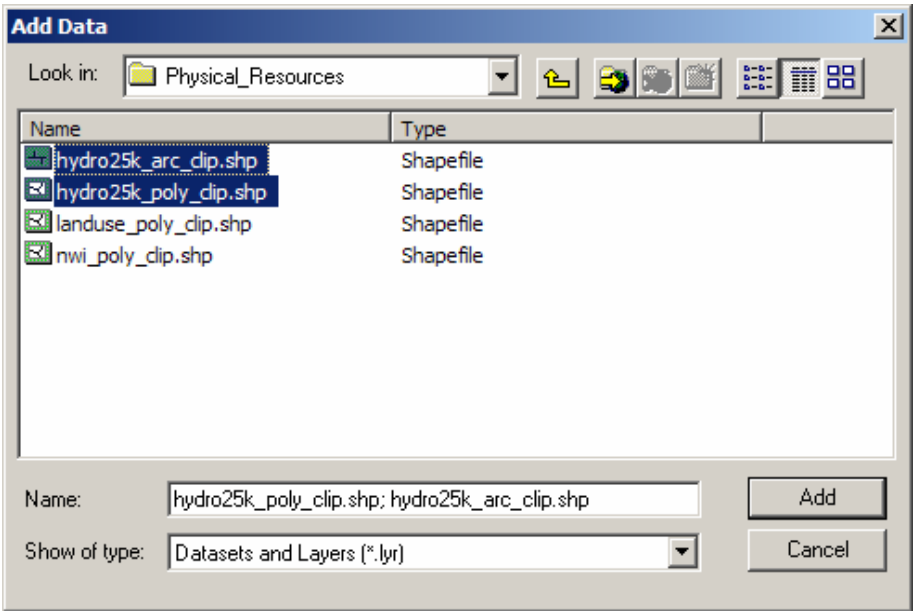
6. In the *Add Data* dialog box, navigate to the folder where you put the GIS Tutorial Data

7. You should see the GIS data folders for MassGIS and Somerville

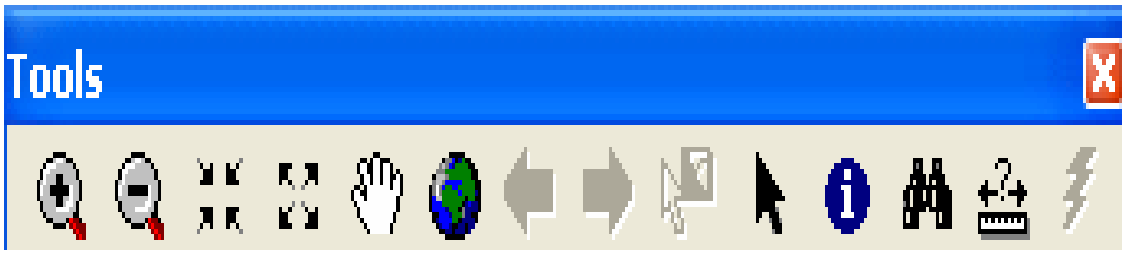
8. Open the **Somerville** folder and add data layers that are highlighted below (you can hold down the CTRL key and click on each layer in turn to select multiple layers, then press ADD or just click on.



9. Next, choose the **Add Data** icon again, and back up and navigate to the **MassGIS – Physical resources**

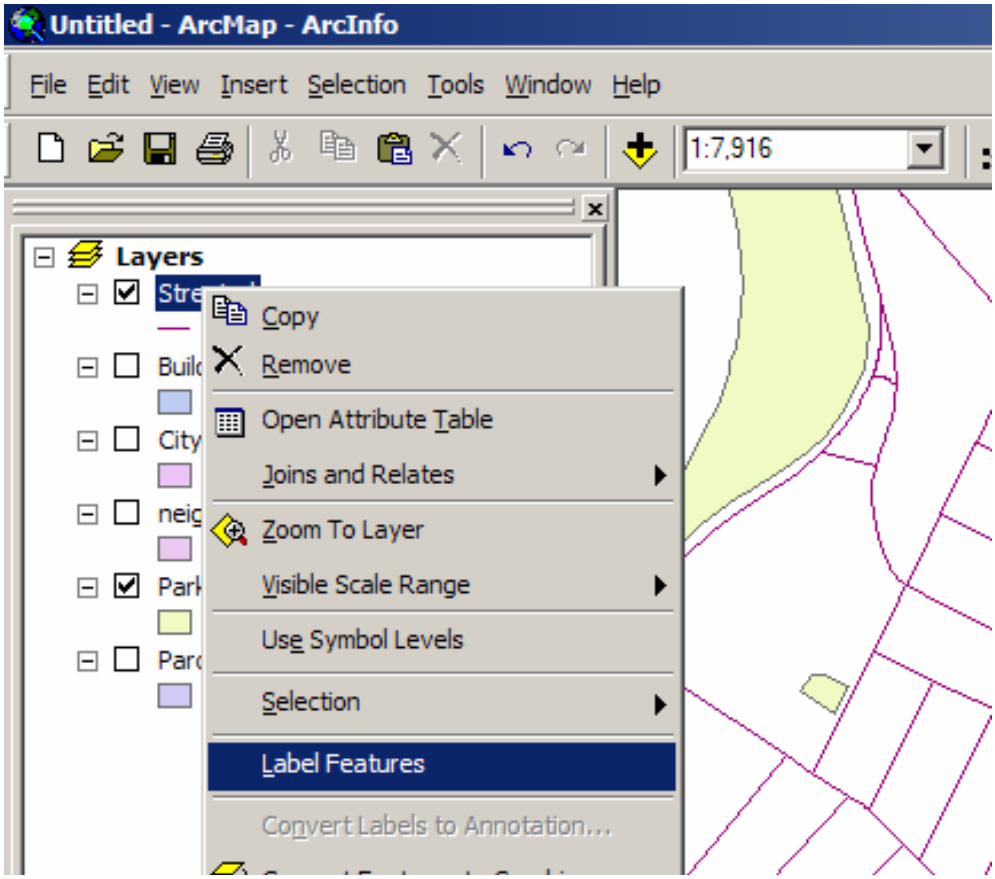


10. All the data layers added will appear in your map .Start unchecking them in the *Table of Contents* (or, to turn them all off at once, hold down the CTRL key and uncheck one of them - they will all turn off).
11. Turn on (check) just street centerlines (**Streetscl**), **hydro25k_poly_clip**, and **parks**
12. Zoom into a part of Somerville using *zoom-in* tool  . When using the zoom tool, you can click and drag a box around the area you would like to zoom in to. Use the *zoom in, zoom out*, and *pan*  tools to move around the map, and the *Zoom to Full Extent* tool () to go back to the full view (in ArcGIS, you can place the cursor over each tool in the menu without clicking to it.



13. Choose **Edit – Find**, and type in *Professors Row*, then **right-click** on one of the results, and choose *Flash Feature* or *Zoom to Feature*).

14. Right-click on the *Streetcl* layer in the *table of contents* (be sure you right-click on the actual name and not on the line symbol) and then click on *Label Features* as you see here - this will label the streets, although the labeling takes a minute to appear .

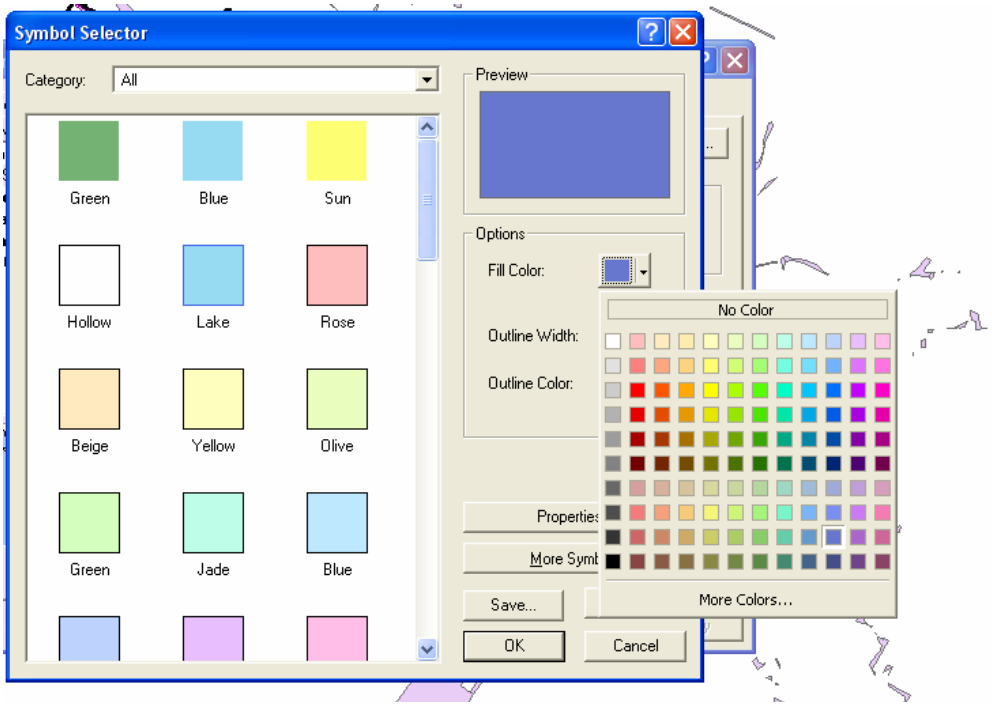


Coloring the data layers

15. The map would be a lot better if the water were colored blue, the parks green, etc.

16. Right-click on the *hydro25k_poly_clip* layer ("Ponds and Rivers"depending on the names that you have used in order to bring up the *Properties* dialog box again.
17. Click on the *Symbology* tab.

18. To change the color of the layer, click on the colored box under *Symbol* - this should bring up the symbol selector box.
19. Click on a color from the choices on the left, or click on the small colored box next to *Fill Color*, to see a wider range of colors to choose from – choose a blue color for water. Do the same for the park whereby the green color is chosen.



20. Press OK when you are finished, and OK again to return to your map.

21. When finished, choose **File-Save** again. This is important because it will enable you to access your map for future reference.

22. When the map is complete the students should present their results to the GIS instructor who can reject it on the basis that the features were coded and colored wrongly and where some procedures were skipped such that the output was poor.This imply that the same procedures have to be repeated again in order to ensure that the product is of high quality as well as enable the learners to get the concept.On the other hand, the product is acceptable if it has correct labels and colouring.

4.0 RECORDS

Record ID	Owner	Location	Record Media	Retention/Disposition