

The CEDRA Corporation's COMMAND OF THE MONTH

A monthly information bulletin

September 2009

FEATURED COMMAND

ArcGIS Server
Buffer Features



Application Description

Last month we discussed the CEDRA [Identify] tool for ArcGIS Server which provided the user the ability to identify a feature, with or without related data, in an ArcGIS Server Web Application.

Continuing with the ArcGIS Server theme, this month we would like to discuss the application of buffering either a point or a feature so as to select other features within proximity of the base point or feature.

Additionally, we would like to add the functionality of exporting the attributes that are associated with the selected features. Specifically, we desire to create an ASCII based file (.txt) that contains the attributes in a comma delineated format.

In so doing, the ASCII file could be opened in any text editor, such as Notepad or Word, for the purpose of creating mailing labels, or any other purpose, using this data.

The CEDRA Solution

To address this application, The CEDRA Corporation has developed two custom Buffer tools: [BufferP], , which buffers about a base point, and [BufferF], , which buffers about a base feature. Both tools employ a user-specified buffer distance value in the buffering.

Like the [Identify] tool discussed last month, the [BufferP] and [BufferF] tools can be added to any existing Web Application, whose application code is

VB.NET based, using the Microsoft Notepad program. In so doing, the user is able to customize a Web Application without having to use an IDE, such as Microsoft Visual Studio.

Modifying the Web Application

Building upon the application developed in the previous issue of Command of the Month, we will add the [BufferP] and [BufferF] tools to the Test4 application .

Command Of The Month bulletin

This month's issue discusses how custom tools that buffer either a point or a selected feature can be added to an ArcGIS Server Web based application.

The same approach discussed in last month's issue will be used to add the two Buffer tools. That is to say, Notepad will be used to modify existing files, while new files will be added to the App_Code and Images folders.

CEDRA Buffer Tools Overview

The custom Buffer tools developed by The CEDRA Corporation operate on the premise that an active layer must be defined. The features which are selected come from the Active Layer. As such, the [Set Active Layer] tool, , must be selected prior to activating either of the Buffer tools. Furthermore, the [BufferF] tool selects the base feature from the Active Layer.

Once the base point or feature has been defined, the user is prompted for a buffer distance value. Using this value, the tools determine which feature(s) fall within the buffer created about the base point or feature.

Once the features have been selected, the tools will highlight the base point or feature, as well as the selected features, and allow the user the ability to download an ASCII file (.txt) that contains the attributes of the selected features.

Implementing the CEDRA Buffer Tools

The following steps describe how the custom Buffer tools can be incorporated into the Test4 Web Application created in last month's issue.

1. Copy the following files into the App_Code folder.

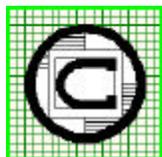
PointBufferTool.vb
Utility.vb

The PointBufferTool.vb file is a new file, while the Utility.vb file is a modified version of the file referenced in last month's issue.

2. Copy the following files into the Images folder.

BufferP.GIF
BufferF.GIF

The above two files are the icons for the two tools. As the names indicate, the bufferp.gif file is the icon for the [BufferP] tool, while the bufferf.gif file is the icon for the [BufferF] tool.



The CEDRA Corporation

**Total CADD for Engineers™
Bridging Engineering and GIS™**

Phone: 585-232-6998
Fax: 585-262-2042

151 Sully's Trail - Suite 6
Pittsford, New York 14534

E-mail: cedra@cedra.com
URL: <http://www.cedra.com>

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- Modify the Default.aspx.vb file, using Notepad, by adding Code Block A above the line:

```
End Class
```

This is the last line in the Default.aspx.vb file.

- Select the {File} [Save] command to save the modifications and then the {File} [Exit] command to exit Notepad.
- Modify the Default.aspx file, using Notepad, as shown in Code Blocks B and C.

Finally, modify the Width property value shown in Code Block D from 280px to 350px. This property controls the width of the toolbar. As tools are added to the toolbar, if the width of the toolbar is not increased, the tools will begin to encroach on each other.

Furthermore, it is possible to control the default active tool on the toolbar via the CurrentTool property. For example the default active tool could be changed from MapPan to MapZoomIn, if so desired. The name that is used in the CurrentTool property is derived from the Name property as shown in Code Block B. That is, the name that appears in the <esri:Tool tag.

- Select the {File} [Save] command to save the modifications and then the {File} [Exit] command to exit Notepad.
- Invoke ArcGIS Server Manager and log in.
- Click on the Applications tab and select the Web Applications menu item. A list of the published Web Applications should appear on the screen.
- Right-click on the Test4 application and select the Edit menu item from the pop-up menu list.

- A message box stating that the application has been modified external to Manager will appear. Click the Yes button to import the modified Web Application. If all goes well the Edit Web Application dialog box should appear.

If not, an error was detected in the Web Application and a message to that effect will be displayed. At this point exit Manager and check the modifications that were made to the files: Default.aspx and Default.aspx.vb.

- Click the **Finish** button to rebuild the application. Once the application has been rebuilt it should appear in the Web browser.

Using the BufferP Tool

This Buffer tool will create a buffer about a point and select the features which intersect a circular buffer.

To use this tool the user should perform the following:

- Select the [Set Active Layer] tool,  and pick the layer from the drop-down list that is to serve as the current active layer.

- Select the [BufferP] tool, .
- Make a pick in the map area denoting the center of a circular buffer.
- Enter the radius of the circular buffer and click the OK button to confirm the entry or the Cancel button to abort the command, see Figure 1.



Figure 1
Buffer Distance Dialog Box

If the OK button is selected, the tool creates a circular buffer and determines which features in the current active layer intersect the circular buffer.

Upon completion of the processing, see Figure 2, the tool:

- Highlights the base point or center of the circular buffer,
- Highlights the selected features and
- Displays a dialog box which enables the user to download an ASCII based file that contains the attributes of the selected features in a comma delineated format, see Figure 3.

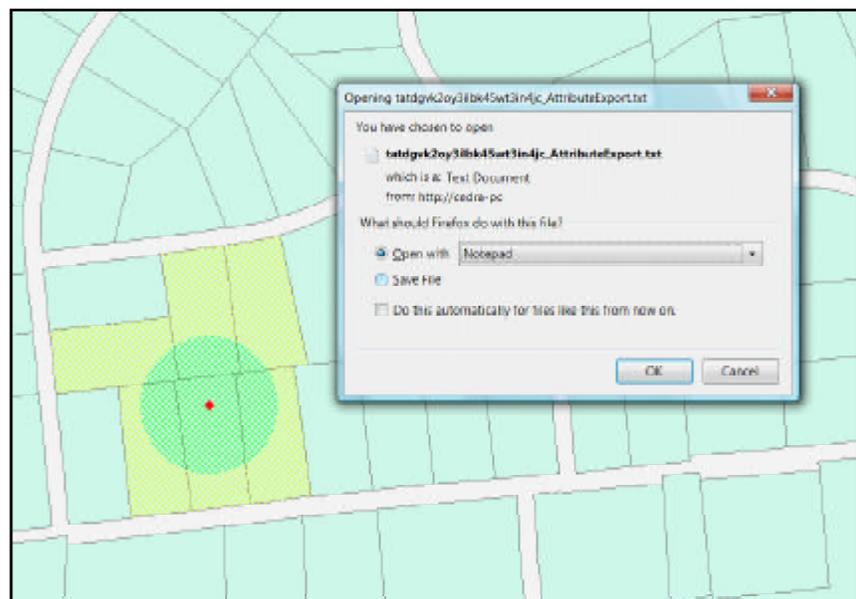


Figure 2 - BufferP Tool Results

FID	MUNICODE	BLOCK	LOT	QUALIFIER	TAX_MAP	COMMENTS
752	1024	000060002	000240004	00000	1,OLD	00006 0200024 04
753	1024	000060002	000240003	00000	1,OLD	00006 0200024 03
757	1024	000060002	000240002	00000	1,OLD	00006 0200024 02
876	1024	000060002	000240014	00000	1,OLD	00006 0200024 14
878	1024	000060002	000240015	00000	1,OLD	00006 0200024 15
891	1024	000060002	000240017	00000	1,OLD	00006 0200024 17

Figure 3 - Sample Attribute Text File Created by the Buffer Tools

Depending upon the Web Browser in use, the dialog box shown in Figure 2 will vary. That is to say, each browser displays a different download dialog box.

Using the BufferF Tool

This Buffer tool will create a buffer about a selected feature and select the features which intersect a buffer which surrounds the selected feature.

To use this tool the user should perform the following:

1. Select the [Set Active Layer] tool,  and pick the layer from the drop-down list that is to serve as the current active layer.
2. Select the [BufferF] tool, .

3. Make a pick in the map area such that the base feature can be selected.
4. Enter the buffer distance value and click the OK button to confirm the entry or the Cancel button to abort the command, see Figure 1.

If the OK button is selected, the tool creates a buffer about the selected feature and determines which features in the current active layer intersect the buffer.

- Upon completion of the processing, see Figure 4, the tool:
- a. Highlights the base feature,
 - b. Highlights the selected features and
 - c. Displays a dialog box which enables the user to download an ASCII based file that contains the attributes

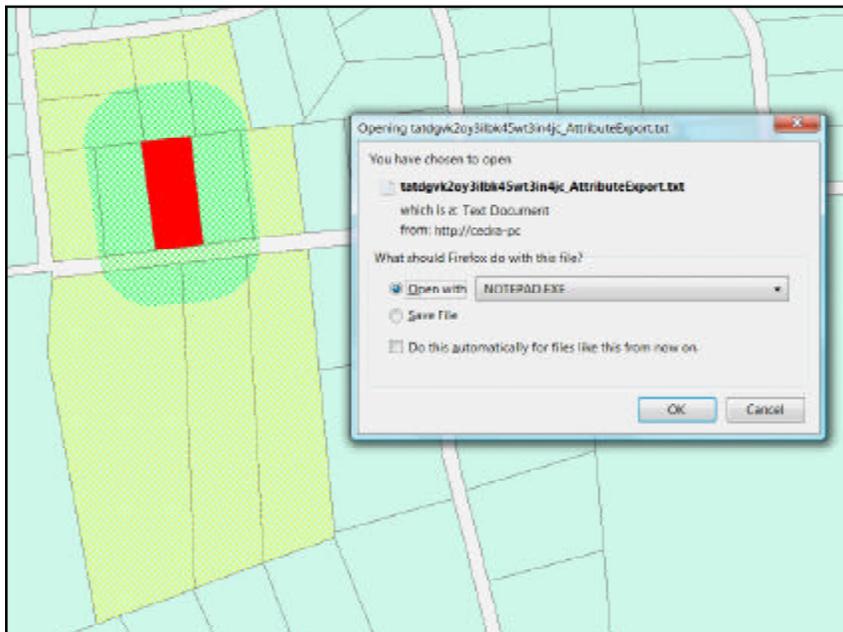


Figure 4 - BufferF Tool Results

of the selected features in a comma delineated format, see Figure 3.

Depending upon the Web Browser in use, the dialog box shown in Figure 2 will vary. That is to say, each browser displays a different download dialog box.

Notes

- a. The base feature that is selected by the [BufferF] tool will be a feature that resides in the current active layer.
- b. The Web Browser that is used is extremely important when working with a Web Application. Depending upon the browser how a tool performs will vary. The custom tools described here were tested using Mozilla Firefox 3.5.2.

Summary

As users migrate to Web based applications, the ability to incorporate custom tools becomes more and more important. Therefore, the ability to incorporate custom tools, without having to add staff that is programming knowledgeable, is beneficial. As such, the approach discussed in this month's issue of Command of the Month should be helpful in this regard.

For those who are interested in acquiring the source code for the [BufferP] and [BufferF] tools, as well as code blocks A through D, contact: Lisa Stone at lstone@cedra.com.

As always, should the reader have any suggestions on functionality that should be featured in Command of the Month, please feel free to forward them on to us.

If you have a request for Command Of The Month, feel free to phone, fax or e-mail your request to The CEDRA Corporation.

```

'
' ---CEDRA
'
' ---Utility code for the Buffer about a Point Tool
'
' ---This routine will handle the processing for the Buffer about a Point tool, it is
' ---invoked when the user clicks the OK button, that is, the Button control
' ---called btnBufferOK within the DIV called BufferPanel
Protected Sub btnBufferOK_Click(ByVal sender As Object, ByVal e As System.EventArgs)
Handles btnBufferOK.Click
'
' ---Make sure the active layer is defined
Dim iALIdx As Integer
If Not ActiveLayerPicker.IsActiveLayerSet(iALIdx) Then
' ---Display an error message within the DIV called BufferPanel
lblBufferMessage.Text = "No active layer set."
Return
End If
'
' ---Initialize the error message string
lblBufferMessage.Text = ""
'
' ---Get the buffer distance from global memory and convert it into a string
Dim s As String = ""
If (Not System.Web.HttpContext.Current.Session("BufferDistance") Is Nothing) Then
s = CType(System.Web.HttpContext.Current.Session("BufferDistance"), String)
End If
'
' ---Valdity check of the buffer distance value
If Not (Utility.IsDouble(s)) Then
' ---Display an error message within the DIV called BufferPanel
lblBufferMessage.Text = "Invalid buffer distance."
Return
End If
'
' ---Valdity check of the buffer distance value
Dim d As Double = CType(s, Double)
If (d <= 0) Then
' ---Display an error message within the DIV called BufferPanel
lblBufferMessage.Text = "Invalid buffer distance."
Return
End If
'
' ---The buffer distance has been properly defined, perform the buffer operation
BufferClasses.PointBufferExecution.ExecuteBuffering(Map1, iALIdx, d)
'
' ---BECAUSE THIS CLICK EVENT WAS NOT INITIATED BY THE MAP (IT WAS INITIATED BY THE
' ---btnBufferOK), BUT THE CALLBACK RESULTS INCLUDE A CHANGE OF THE MAP DISPLAY
' --- (HIGHLIGHTING OF SELECTED FEATURES), AFTER ADDING THE CALLBACK RESULTS TO THE
' ---MAP, THE SCRIPTMANAGER NEEDS TO BE INFORMED THAT THE MAP HAS CALLBACK RESULTS
' ---TO PROCESS AND TO ACTUALIZE THOSE RESULTS. THE MAP CAN ONLY REFRESH ITSELF
' --- AUTOMATICALLY WHEN IT IS THE CONTROL TO HAVE INITIATED THE CALLBACK
'
' ---Update the Web page
If ScriptManager1.IsInAsyncPostBack Then
Dim callbackString As String = Map1.CallbackResults.ToString()
ScriptManager1.RegisterDataItem(Map1, callbackString)
End If
End Sub

```

Code Block A - Default.aspx.vb Addition of the Buffer Tool Subs above the End Class statement

```

'
' ---CEDRA
'
' ---Utility code for the Buffer about a Point Tool
'
' ---This routine will close or dismiss the Buffer about a Point dialog box, it is
' ---invoked when the user clicks the Cancel button, that is, the Button control
' ---called btnBufferCancel within the DIV called BufferPanel
Protected Sub btnBufferCancel_Click(ByVal sender As Object, ByVal e As System.EventArgs)
Handles btnBufferCancel.Click
'
' ---Build the Callback that will run the JavaScript that will close
' ---the dialog box
Dim theCallbackResult As ESRI.ArcGIS.ADF.Web.UI.WebControls.CallbackResult
theCallbackResult = New ESRI.ArcGIS.ADF.Web.UI.WebControls.CallbackResult(Nothing,
Nothing, "javascript", "hideShowBufferDialog();")
'
' ---Add the Callback to the Map's Callback list
Map1.CallbackResults.Add(theCallbackResult)
'
' ---Update the Web page
If ScriptManager1.IsInAsyncPostBack Then
    Dim callbackString As String = Map1.CallbackResults.ToString()
    ScriptManager1.RegisterDataItem(Map1, callbackString)
End If
End Sub
'
' ---CEDRA
'
' ---Utility code for the Buffer about a Point Tool
'
' ---This procedure handles the TextChanged event for the TextBox control called
txtBufferDistance
' ---within the DIV called BufferPanel
Protected Sub txtBufferDistance_TextChanged(ByVal sender As Object, ByVal e As
System.EventArgs) Handles txtBufferDistance.TextChanged
'
' ---Get the buffer distance value specified by the user
Dim s As String = (CType(sender, TextBox)).Text
'
' ---Store the buffer distance value in global memory
System.Web.HttpContext.Current.Session("BufferDistance") = s
'
' ---Initialize the invalid buffer distance error message
lblBufferMessage.Text = ""
End Sub
'
' ---CEDRA
'
' ---Utility code for the Buffer about a Point Tool
' ---
' --- Buffer about a Feature Tool
' --- Export Attributes Button
'
' ---This procedure streams a text file from the Web Server to the Client's browser, it
' ---is invoked by the openSelectionFile() JavaScript which issues a partial postback
' ---to the server
'
' ---Note: 1. The client's browser must be configured to accept downloads.
' --- 2. In IE8: the Tools
' --- Internet Options > Security Tab
' --- Intranet and Internet Zones
' --- Custom Level > Downloads section
' --- Automatic Prompting for Downloads > Disable
' --- option needs to be set so that the SAVE AS dialog box will not be blocked
' --- by the browse

```

Code Block A - Default.aspx.vb Addition of the Buffer Tool Subs above the End Class statement

```

Protected Sub btnStreamFile_Click(ByVal sender As Object, ByVal e As System.EventArgs)
Handles btnStreamFile.Click
    '
    Response.Cache.SetCacheability(System.Web.HttpCacheability.NoCache)
    '
    ' ---Get the name of the file to be downloaded to the Client's browser
    ' ---from global memory (note that the ExportAttributesToFile procedure
    ' ---in the Utility.vb module will define this global variable)
    Dim sExportName As String =
System.Web.HttpContext.Current.Session("ExportedFileName")
    '
    ' ---Get the full name of the file to be downloaded
    Dim sExportFullName As String =
System.Web.HttpContext.Current.Session("ExportedFullFileName")
    '
    ' ---Check if the file does not exist, if so abort
    If Not System.IO.File.Exists(sExportFullName) Then Return
    '
    ' ---Begin a Try/Catch/End block to handle any potential errors
    Try
        System.Web.HttpContext.Current.Response.Clear()
        System.Web.HttpContext.Current.Response.ClearContent()
        System.Web.HttpContext.Current.Response.ClearHeaders()
        System.Web.HttpContext.Current.Response.ContentType = "application/txt;
charset=UTF-8"
        System.Web.HttpContext.Current.Response.AddHeader("Content-Disposition", "attach-
ment; filename=" & sExportName)
        System.Web.HttpContext.Current.Response.TransmitFile(sExportFullName)
        System.Web.HttpContext.Current.Response.Flush()
        System.Web.HttpContext.Current.Response.Close()
    Catch ex As Exception
        ' ---Error detected
    End Try
End Sub

```

Code Block A - Default.aspx.vb Addition of the Buffer Tool Subs above the End Class statement

```

<esri:Tool Text="PointBuffer" DefaultImage="~/Images/BufferP.GIF" Name="PointBuffer"
ToolTip="Buffer about a Point" ServerActionAssembly="App_Code"
ServerActionClass="BufferClasses.PointBufferTool" ClientAction="hideShowActiveLayerDialog();
MapPoint('Map1', '%toolbarItem%', true, 'crosshair');" JavaScriptFile="" />

<esri:Tool Text="PointBuffer2" DefaultImage="~/Images/BufferF.GIF" Name="PointBuffer2"
ToolTip="Buffer about a Feature" ServerActionAssembly="App_Code"
ServerActionClass="BufferClasses.PointBufferTool2" ClientAction="hideShowActiveLayerDialog();
MapPoint('Map1', '%toolbarItem%', true, 'crosshair');" JavaScriptFile="" />

```

Code Block B - Default.aspx Modification, Addition of the Two Buffer Tools to the Application's Toolbar

```

<!-- -->
<!-- This DIV is the Buffer Tool dialog -->
<!-- -->
    <div id="BufferPanel" style="border-style: solid; border-bottom-width:1px; border-
right-width:1px; border-left-width:1px; border-top-width:1px; z-index:500; position:absolute;
background-color:White; border-color:Gray; width:400px; height:120px; top:30%; left:30%;
display:block; visibility:hidden">
    <!-- -->
    <!-- This DIV is the Buffer Tool dialog's title bar -->
    <div style="position:absolute; color:White; font-family:Arial; font-style:italic;
background-color:Black; width:100%; height:18px; font-weight:bold; font-size:small; top:0%;
left:0%;" onmousedown="setMoving('BufferPanel')">
        <!-- This is the title bar's caption -->
        <asp:Label ID="captionBuffer" runat="server" Text="Enter Buffer Selection Infor-
mation ..." />
        <!-- This is the title bar's dismiss button; X icon is controlled by the style
tag -->
        <asp:Image ID="ImageBuffer" ImageUrl="images/dismiss.png" runat="server"
AlternateText="Close dialog" onclick="hideShowBufferDialog();" style="right: 0px; font-
weight:bold; font-family:Arial; font-size:9pt; position:absolute; top: 0px" />
    </div>

    <asp:Label ID="lblBufferDistance" runat="server" style=" font-style:italic; font-
weight:bold; font-family:Arial; font-size:10pt; text-align:right; color:Navy;
position:absolute; left:5px; top:36px; width: 150px;" Text="Buffer Distance:" />

    <asp:UpdatePanel ID="UpdatePanel3" runat="server" UpdateMode="Conditional">
        <ContentTemplate>
            <asp:TextBox ID="txtBufferDistance" runat="server" Width="200px"
onfocus="clearBufferMessage();" style="left: 180px; position: absolute; top: 35px" Text="0.0"
/>
            <asp:Button ID="btnBufferOK" runat="server" Text="OK" Height="25px"
Width="60px" style="left: 260px; font-weight:bold; font-family:Arial; font-size:9pt;
position:absolute; top: 85px" />
            <asp:Button ID="btnBufferCancel" runat="server" Text="Cancel" Height="25px"
Width="60px" style="left: 325px; font-weight:bold; font-family:Arial; font-size:9pt;
position:absolute; top: 85px" />
            <asp:Label ID="lblBufferMessage" runat="server" style="color:Red; font-
family:Arial; font-size:10pt; text-align:left; position:absolute; left:180px; top:60px;
width: 180px;" Text="" />
        </ContentTemplate>
        <Triggers>
            <asp:AsyncPostBackTrigger ControlID="txtBufferDistance"
EventName="TextChanged" />
            <asp:AsyncPostBackTrigger ControlID="btnBufferOK" EventName="Click" />
            <asp:AsyncPostBackTrigger ControlID="btnBufferCancel" EventName="Click" />
        </Triggers>
    </asp:UpdatePanel>

    <!-- <input type="button" value="Cancel" style=" height:25px; width:60px; left:
325px; font-weight:bold; font-family:Arial; font-size:9pt; position:absolute; top: 80px";
onclick="hideShowBufferDialog();" /> -->

    <!-- Define the client-side Javascript code -->
    <script type="text/javascript" language="javascript">

        function hideShowBufferDialog(opt) {
            var vis = 'hidden';
            if (opt == 'show') vis = 'visible';
            if (opt == 'Show') vis = 'visible';
            if (opt == 'SHOW') vis = 'visible';
            if (vis == 'visible') clearBufferMessage();
            //
            document.getElementById('BufferPanel').style.visibility = vis;

```

Code Block C - Default.aspx Modification, Addition of the Buffer Dialog Box via the DIV tag

```

        //
        clearBufferMessage();
    }
    //this function will clear any red error message on the buffer dialog (such as
when
    //invalid buffer distance is entered)... called from the onfocus event of the
    //buffer distance input text box "txtBufferDistance"
    function clearBufferMessage() {
        document.getElementById('lblBufferMessage').innerHTML = '';
    }
    </script>
</div>
<!-- This DIV is the Buffer Tool dialog -->

<!--
<!-- This UpdatePanel and Script are used in Exporting a File
<!--
<!-- A partial postback is sent to the server to stream the export file -->
<!-- to the browser's SAVE AS dialog
<!-- The critical portions are the button's style of display:block and
<!-- hidden visibility, an asp:PostBackTrigger (not the async trigger),
<!-- and the script's use of the doPostBack method of JavaScript of
<!-- browser
<!--
<asp:UpdatePanel runat="server" ID="UpdatePanelForFileDownload" UpdateMode="Conditional">
<ContentTemplate>
    <asp:Button ID="btnStreamFile" runat="server" style="display:block;
visibility:hidden" />
</ContentTemplate>
<Triggers>
    <asp:PostBackTrigger ControlID="btnStreamFile" />
</Triggers>
</asp:UpdatePanel>

<script type="text/javascript" language="javascript">
    // This code simulates a user clicking on the btnStreamFile button as it resides in
an update panel
    function openSelectionFile() { __doPostBack('btnStreamFile', ''); }
</script>
<!-- This UpdatePanel and Script are used in Exporting a File
-->

```

Code Block C - Default.aspx Modification, Addition of the Buffer Dialog Box via the DIV tag

```

<esri:Toolbar ID="Toolbar1" runat="server" BuddyControlType="Map" Group="Toolbar1_Group"
Height="28px" ToolbarItemDefaultStyle-BackColor="Transparent" ToolbarItemDefaultStyle-Font-
Names="Arial" ToolbarItemDefaultStyle-Font-Size="Smaller" ToolbarItemDisabledStyle-
BackColor="Transparent" ToolbarItemDisabledStyle-Font-Names="Arial" ToolbarItemDisabledStyle-
Font-Size="Smaller" ToolbarItemDisabledStyle-ForeColor="Gray" ToolbarItemHoverStyle-Font-
Bold="True" ToolbarItemHoverStyle-Font-Italic="True" ToolbarItemHoverStyle-Font-Names="Arial"
ToolbarItemHoverStyle-Font-Size="Smaller" ToolbarItemSelectedStyle-BackColor="WhiteSmoke"
ToolbarItemSelectedStyle-Font-Bold="True" ToolbarItemSelectedStyle-Font-Names="Arial"
ToolbarItemSelectedStyle-Font-Size="Smaller" ToolbarStyle="ImageOnly" WebResourceLocation="/
aspnet_client/ESRI/WebADF/" Width="280px" ToolbarItemHoverStyle-BorderColor="Black"
ToolbarItemSelectedStyle-BorderColor="Black" CurrentTool="MapPan" Alignment="Right"
ToolbarItemDefaultStyle-BorderColor="Transparent" CssClass="appFloat2" ToolbarItemHoverStyle-
BackColor="White">

```

Code Block D - Default.aspx Modification, Toolbar Default Tool and Toolbar Width Properties