

## References

- [1] Elmasri, Navathe, Somayajulu, Gupta (2006) *Fundamentals of Database Systems*, Published by Dorling Kindersley (India) Pvt. Ltd.  
3.8, pp 43-93 and 8.3.1, pp 256-267
- [2] David mcamis, (2006), *Crystal Reports XI for Developers*, Charles River media, inc.  
2, 3, 4 pp 17-152
- [3] Igor Hawryszkiwe, (1998) *Introduction to System Analysis and Design*. 4<sup>th</sup> Edition, Prentice Hall 1998.
- [4] Ivon, Sommerville, (2006) *Software Engineering*. 7<sup>th</sup> Edition, Published by Dorling Kindersley (India) Pvt. Ltd.  
pp 87-90
- [5] Rod Stephens (October 2004) *Visual Basic 2005 Programmer's Reference*, Published by Wrox publishers
- [6] Thearon Willis (October 2004) *Beginning VB.NET Databases*, Published by Wrox publishers
- [7] Alacatel-Lucent 5526 Access Management System (AMS)  
[www.alacatel-lucent.com/products/productssummary.jsp?productNumber=a5526amsr4](http://www.alacatel-lucent.com/products/productssummary.jsp?productNumber=a5526amsr4)
- [8] Fujitsu GeoStream A500 Series Ethernet-PON System  
[www.fujitsu.com/global/services/telecom/archive/geoa500/epon/](http://www.fujitsu.com/global/services/telecom/archive/geoa500/epon/)
- [9] Huawei iManager T2100 is generally available now, date August 18, 2006,  
No: PAL-NW-2006-015-Global  
[www.huawei.com/news/view.do?id=1985&cid=-1001](http://www.huawei.com/news/view.do?id=1985&cid=-1001)
- [10] Louis Davidson, date 26 February 2007  
Data Architect for Compass Technology in Chesapeake, Virginia  
[www.simple-talk.com/sql/database-administration/ten-common-database-design-mistakes/](http://www.simple-talk.com/sql/database-administration/ten-common-database-design-mistakes/)
- [11] <http://www.agilemodeling.com/essays/umlDiagrams.htm>
- [12] [http://en.wikipedia.org/wiki/Database\\_design](http://en.wikipedia.org/wiki/Database_design)

## Feasibility Study

### A.1 Economic Feasibility

Cost of Resources needed for Development for Alarm monitoring system

When developing this system, the resources needed are;

Human Resources- 300 Man Hours Max. (4manhour/day x 5days/week x 15 weeks)

### A.2 Technical Feasibility

#### A.2.1 Development Risk

New ZTE BSS system is IBSC which is working with IP base signaling. When implementing IBSCs and their BTS sites. The alarms and Databases are different. In such a situation expected goals and schedules would not be achieved.

#### A.2.2 Resource Availability

##### A.2.2.1 Hardware

Currently for developing purpose personnel computers with necessary software are being purchased.

- Computer with Intel Pentium IV processor.
- 512 MB RAM or higher.
- 40 GB free hard drive space.
- CD driver or higher

For the deployment of the proposed system, the existing hardware and software (Figure A.1) at Hutchison telecom can be used straight away.

##### A.2.2.2 Software

Operating System	Windows XP Professional with SP2 or higher
Database	Ms SQL Server 2005
Developing Tool	VB.net
Icon/Logo	Adobe Photoshop
Documentation	Microsoft Word 2003 or higher

Figure A.1 – Software availability

##### A.2.3 Technical know-how

I am familiar with VB6 and Ms SQL and familiar with project management methods. Need to follow VB.net for Ms SQL and to import data from Oracle to Ms SQL Server.

### **A.3 Organizational Feasibility**

New System is one of the major needs for Hutch OMC. So The Organization must accept this system for cater with gradually increasing failures. There is no any risk for employees with their jobs other than reduce the burden of their daily maintenance work. So they will accept this system once introduced.

### **A.4 Legal Feasibility**

#### **A.4.1 License**

Hutchison telecom have obtained license for VB.net 2005, Oracle 9i and Ms SQL server 2005 from there vendors.

#### **A.4.2 Agreement**

Software maintenance and services will be provided under software licensing scheme. Yearly the client has to subscribe for the software and this subscription will cover minor system changes within the scope of the proposed system. Also the subscription will cover the consultation for user inquiries related to the system on operation. Software license subscription charges will be Rs. 50,000/= per year. First six months after installation of the system above mentioned services will be provided free of charge.

But any kind of major changes to the system or further enhancement of the system will not be covered under this agreement. Such requests will be considered case by case basis and will be charged based on the complexity of the system requested.

Also, the source codes of the system will not be given to the client under this agreement.

#### **A.4.3 Alternative Systems**

Distributed system can be used instead of common alarm client to access the database and manipulate the data. This distributed system has to be installed separately in each client computer.

### **A.5 Cost Benefit Analysis**

- Tangible Cost

#### Annual Cost

Annual license fee      Rs. 50,000.00

- Intangible Benefits

Time

Since existing process takes time to alarm querying, considerable amount of time is being wasted. Refreshing data and quick notification of the same done with new system can emerge real-time alarm monitoring system.

## **A.6 System Requirements**

The proposed system needs 1 additional Client computer to view the Alarms. And The Alarm client must be interconnected through local area network. The client already holds these requirements with existing Alarm macro system and hence there is no need to invest on purchasing computers and installing network system. Development of the system is done at no cost.

### **A.6.1 Training**

Most of the users who are going to interact with this system have the basic computer knowledge and have knowledge of critical alarms.

Users of the system can be trained within a period of one week. Training is given with no cost.

### **A.6.2 Reliability Requirement**

The system never fails due to power problems. Because Hutchison Alarm monitoring System located in their main Operation Center. The Generator automatically switch on when commercial power failures, if Generator failure they have battery bank with 48 hour duration capacity

### **A.6.3 User Friendliness**

Standard color schemes, font types, font sizes should be used in the proposed system to increase the user friendliness. Standard interface designing models should be used in the system. This can avoid the user surprise from the system.

### **A.6.4 Meaningful system messages**

System should present meaningful messages to user when prompting alerts, error or any instructions.



## Activity Diagrams for the existing system

1. Show Alarms

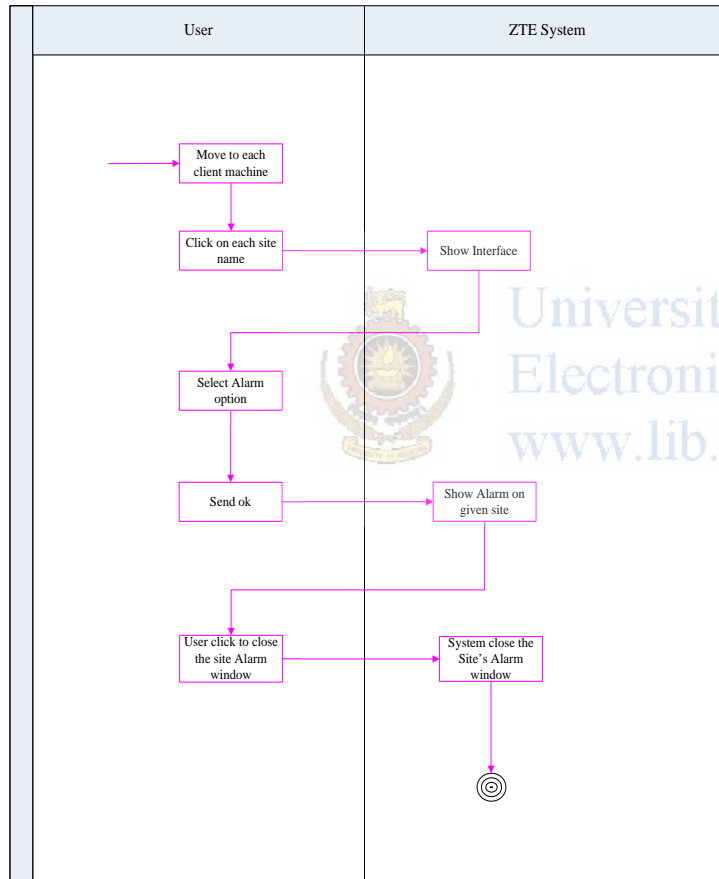


Figure B.1 - Show Alarms

2. Show Alarms History

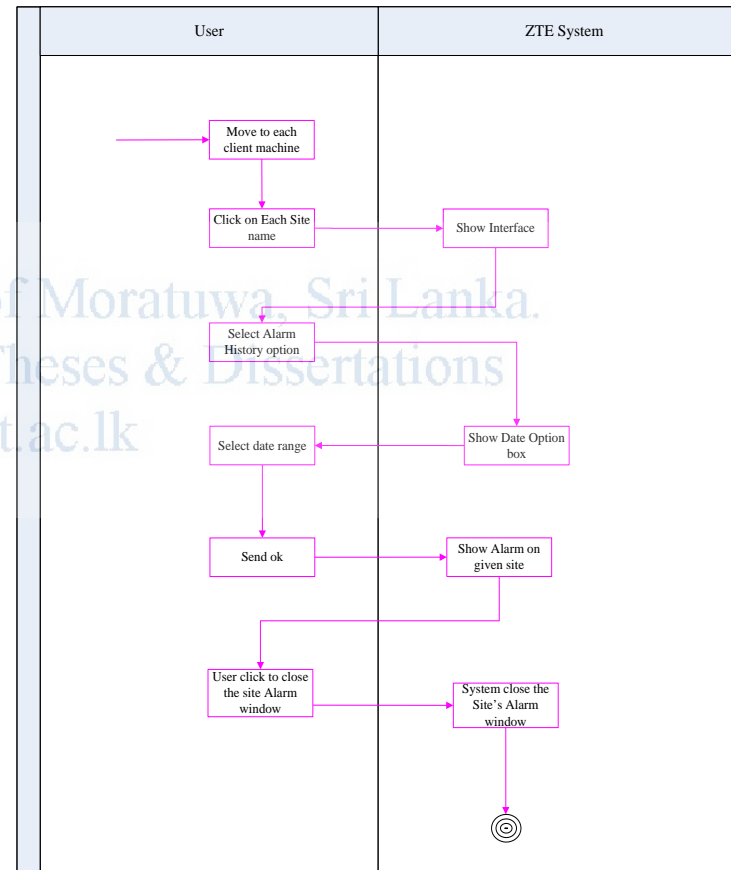


Figure B.2 - Show Alarms history

### 3. Search Alarms

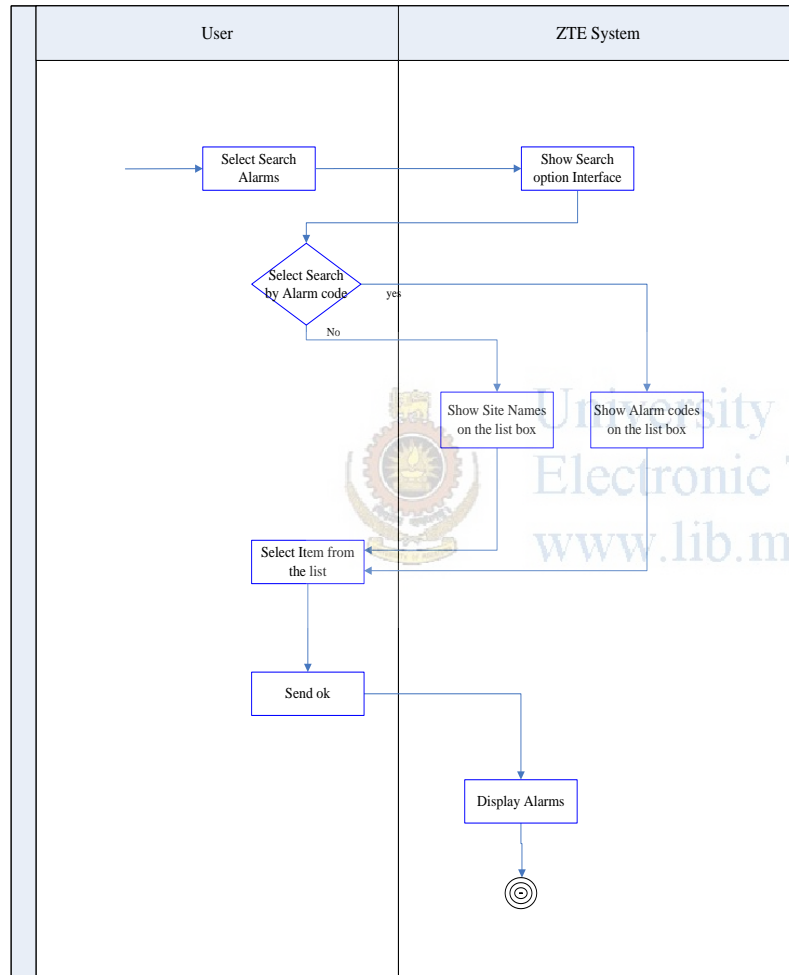


Figure B.3 - Search Alarms

### 4. Print Alarms

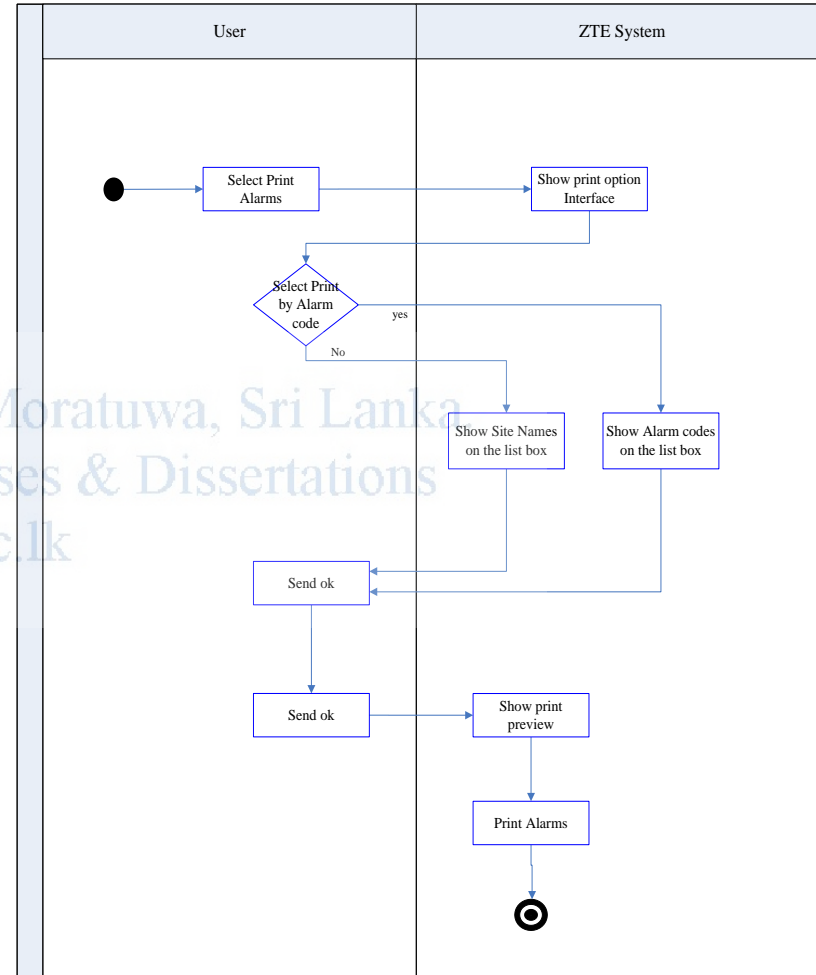
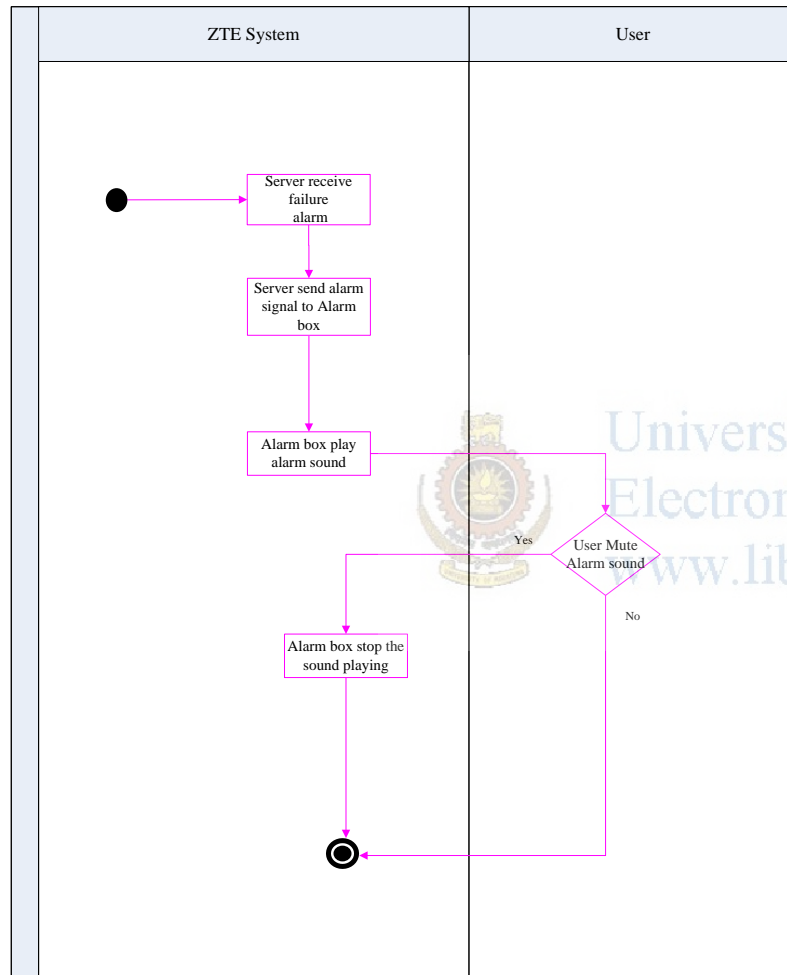


Figure B.4 – Print Alarms

5. Alarm sound play



Q Figure B.5 – Alarm Sound Play

## Activity Diagrams for Proposed HAM System

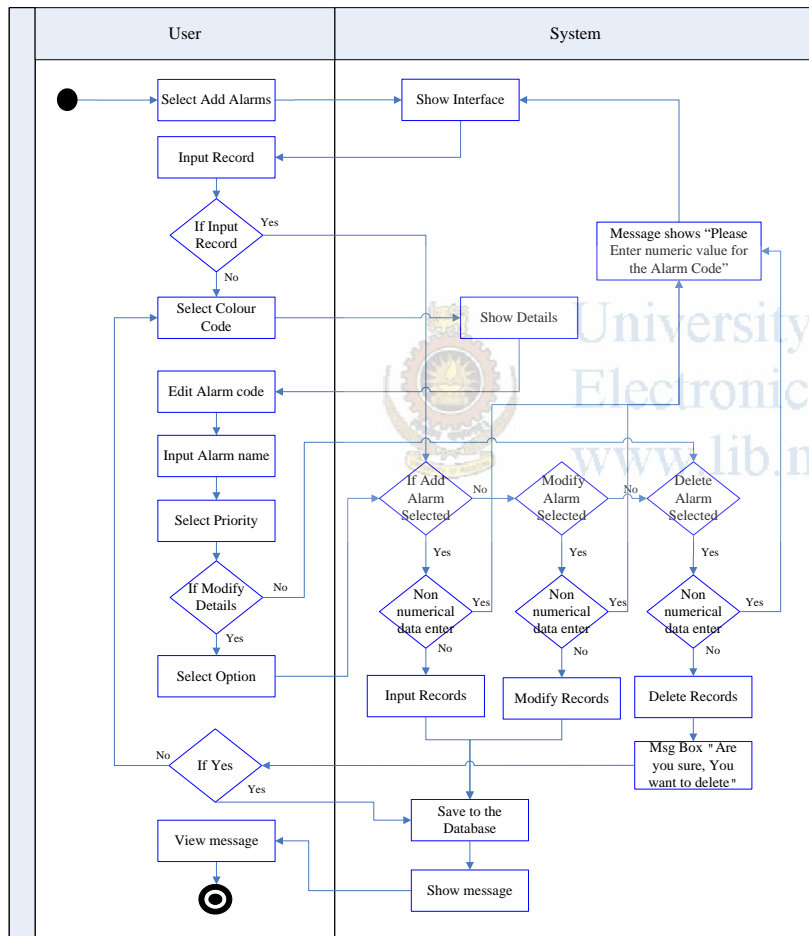


Figure C.1 – Alarm Maintenance

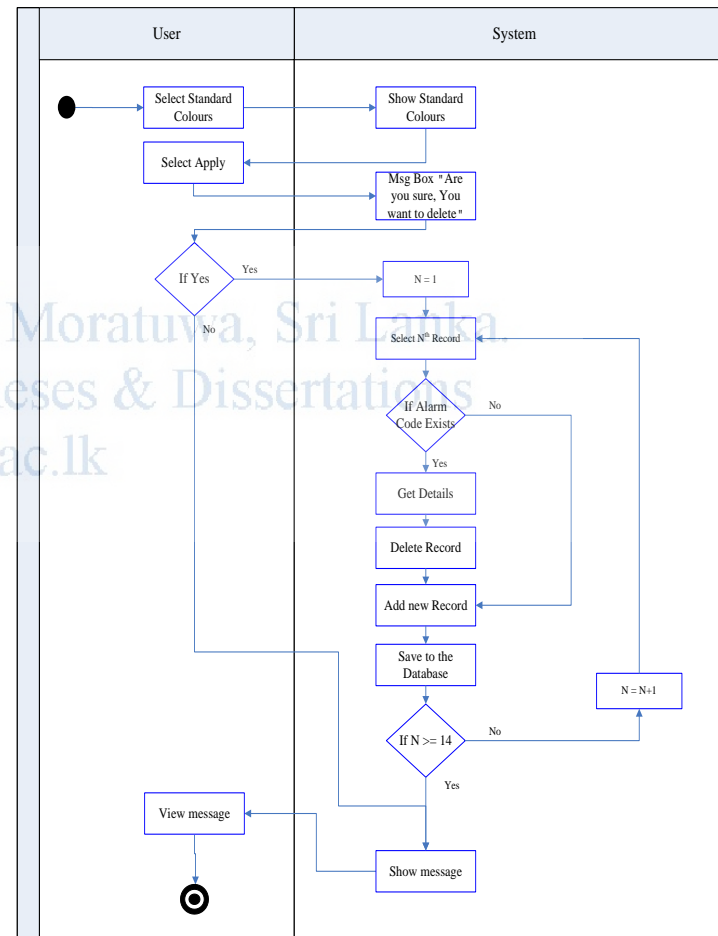


Figure C.2 – Standard Colours

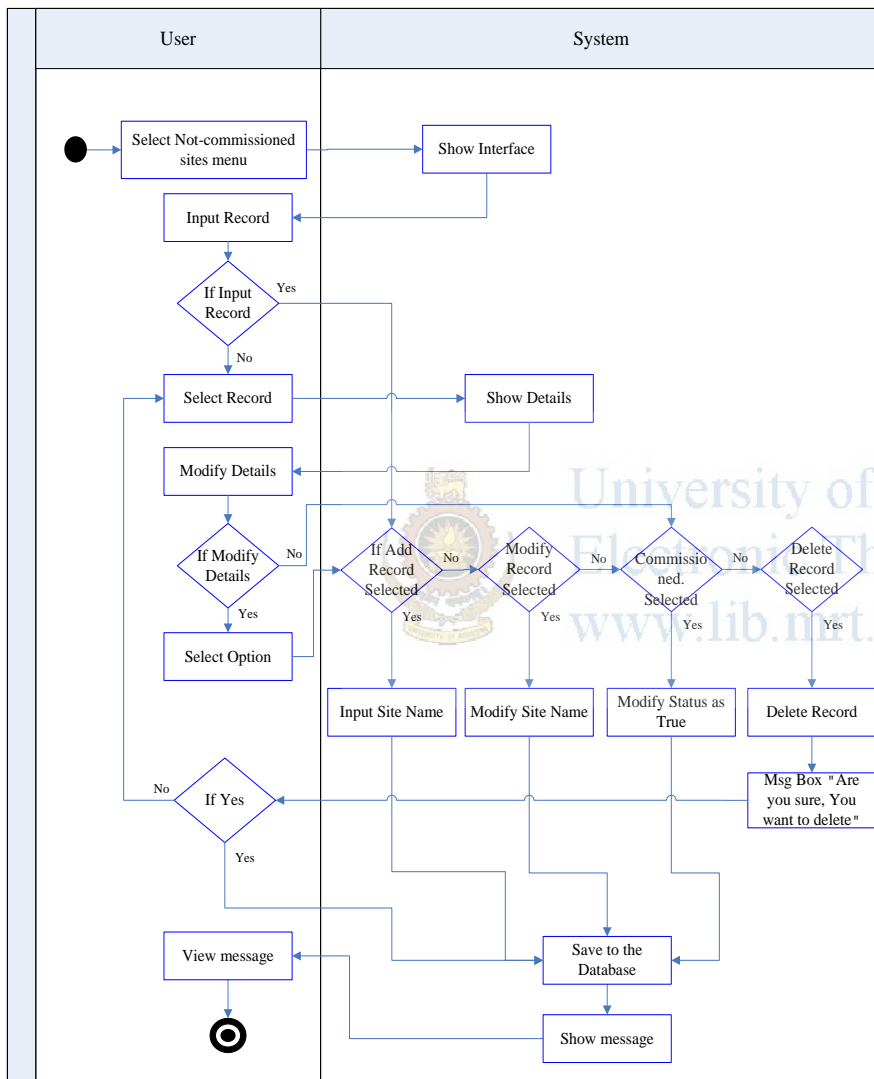


Figure C.3 – Not-Commissioned Site Maintenance

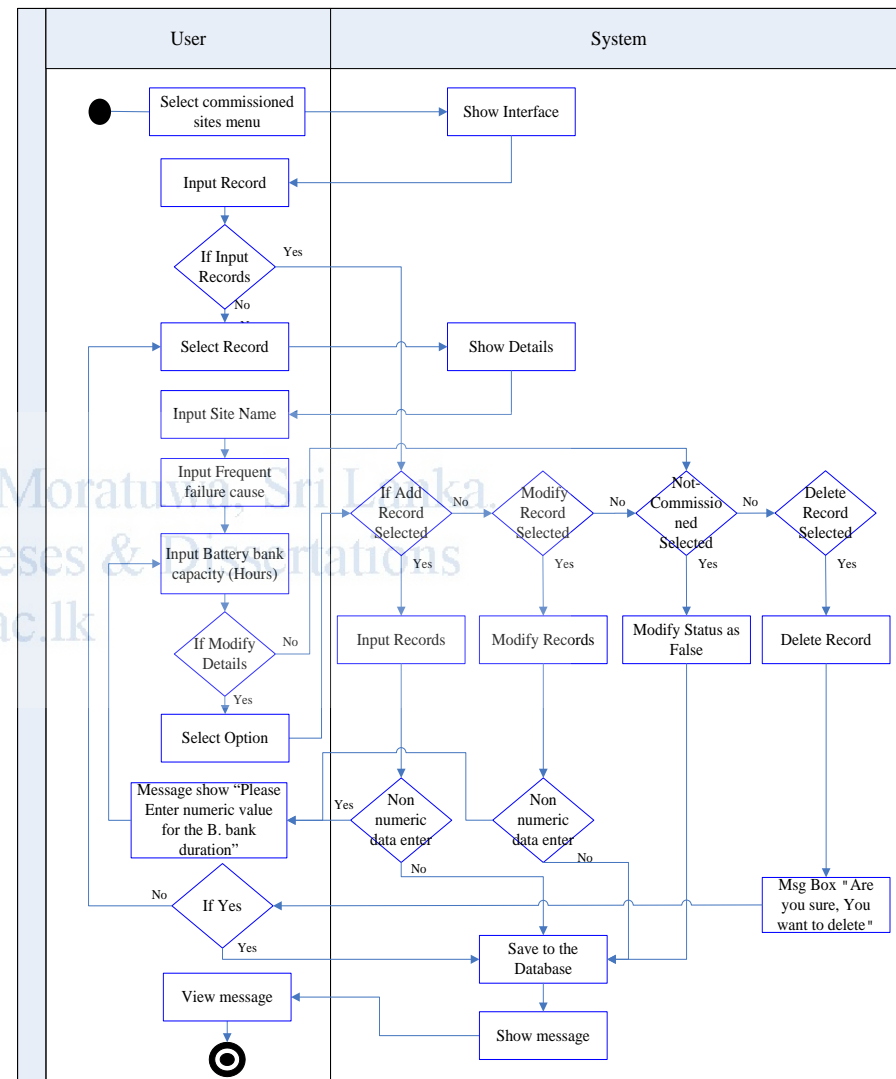


Figure C.4 – Commissioned Site's Alarm History Maintenance

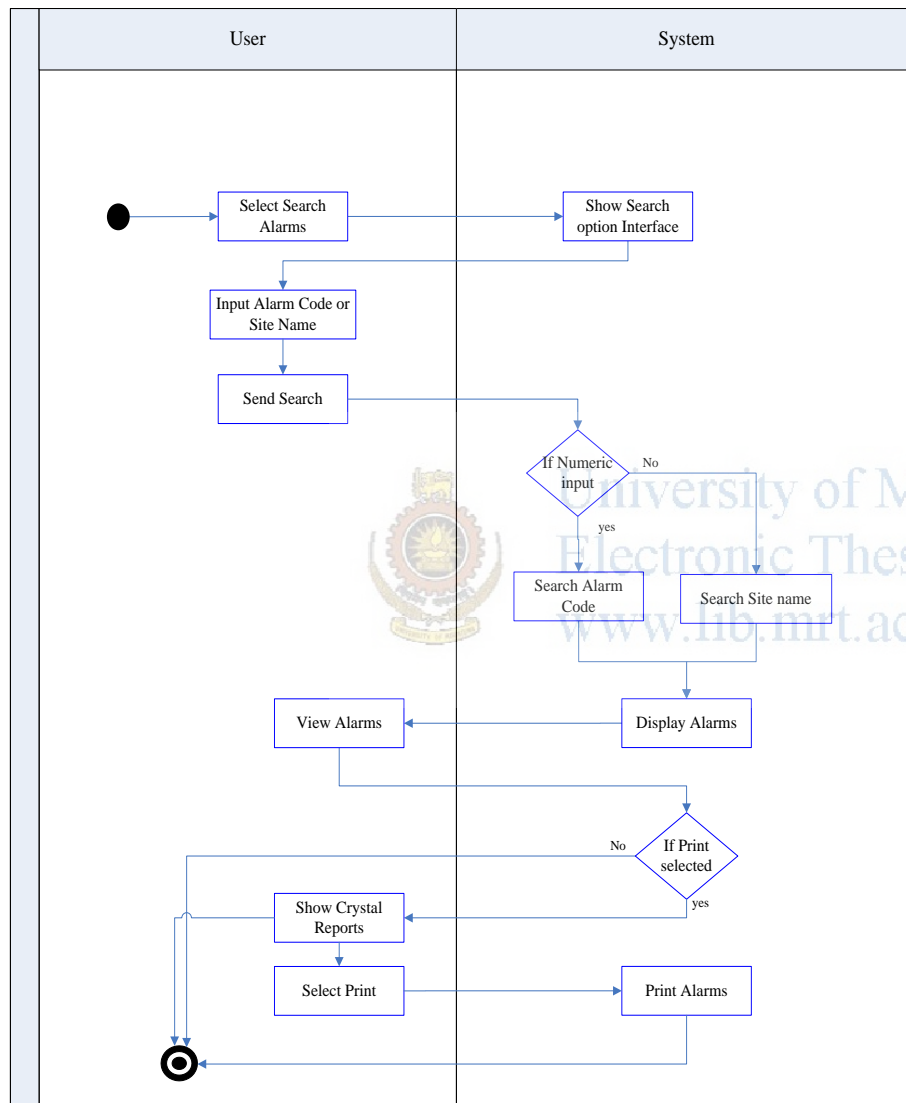
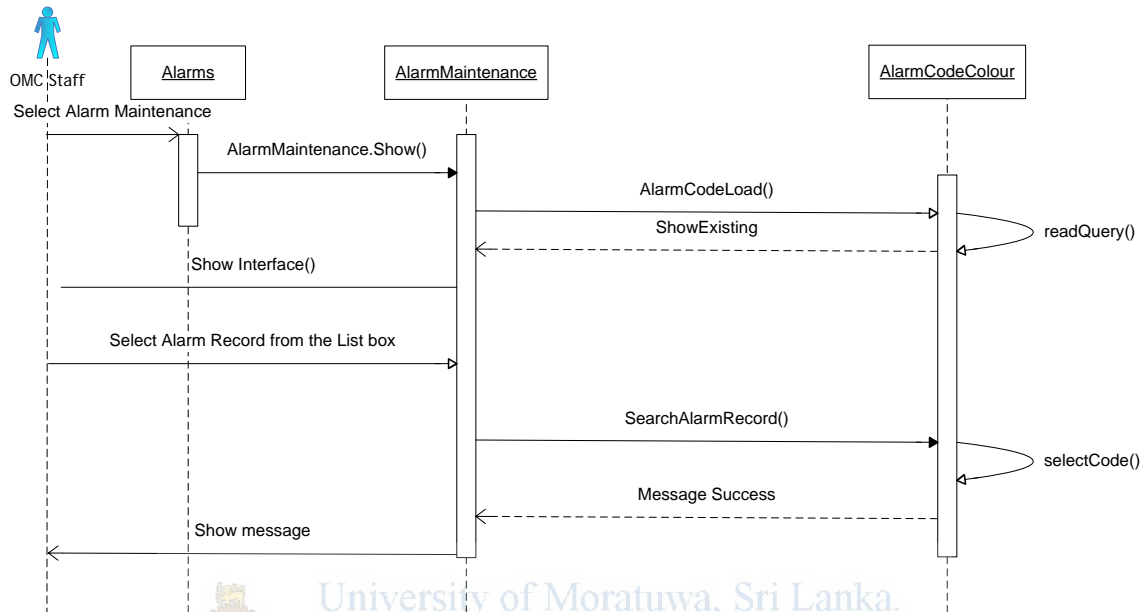


Figure C.5 – Search by Site Name /by Alarm Code

## Sequence Diagrams for The Proposed HAM System



University of Moratuwa, Sri Lanka.  
 Electronic Theses & Dissertations  
 www.np.mrt.ac.lk

Figure D.1 – Alarm Maintenance – Select Alarms

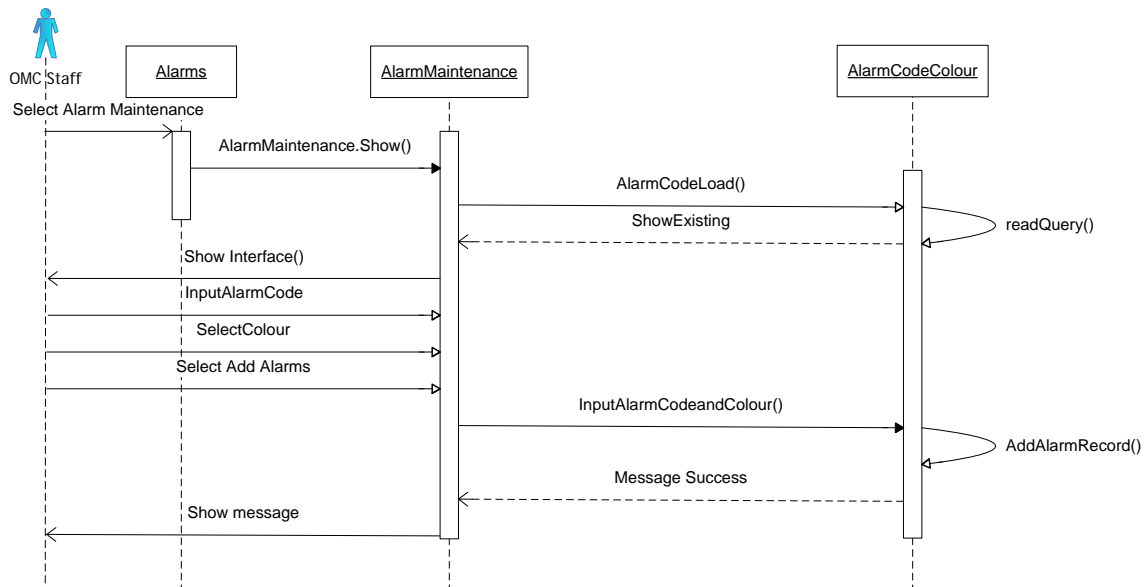


Figure D.2– Alarm Maintenance – Add Alarms

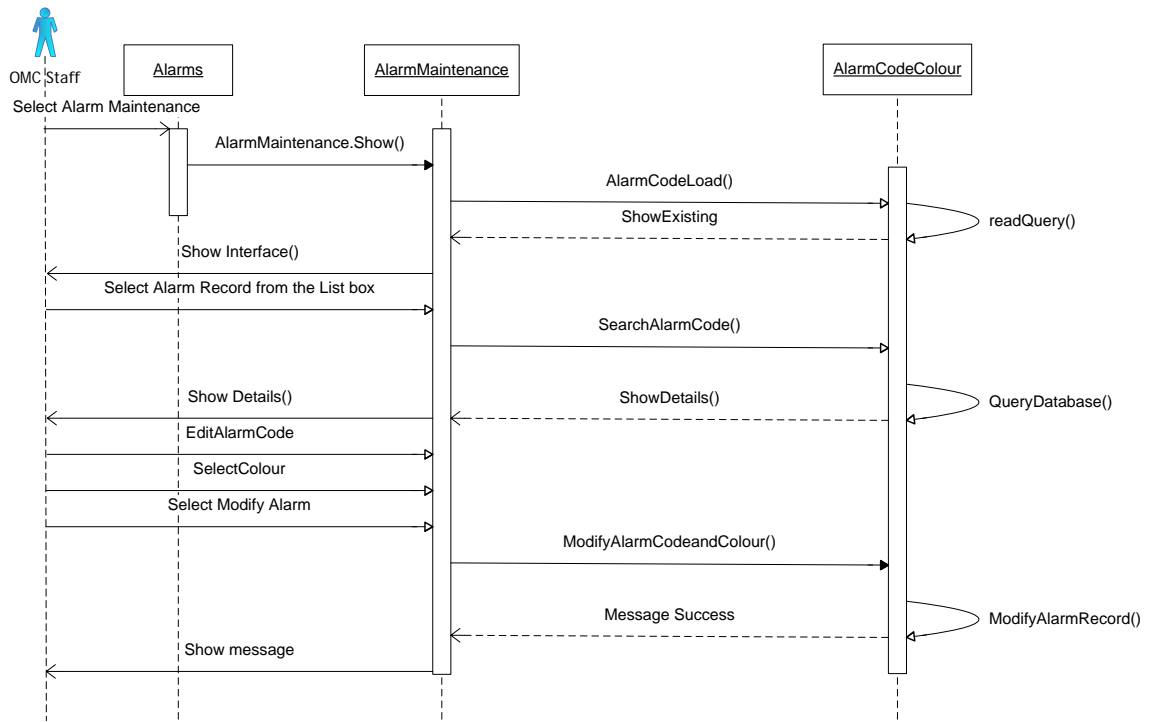


Figure D.3– Alarm Maintenance – Modify Alarms

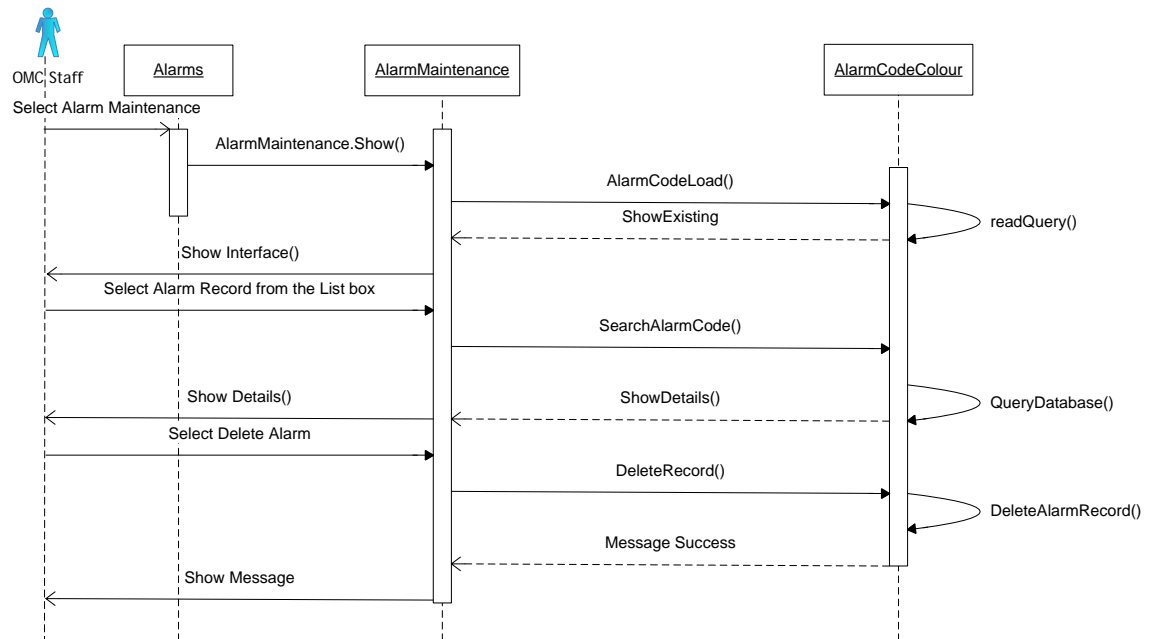


Figure D.4– Alarm Maintenance – Delete Alarms



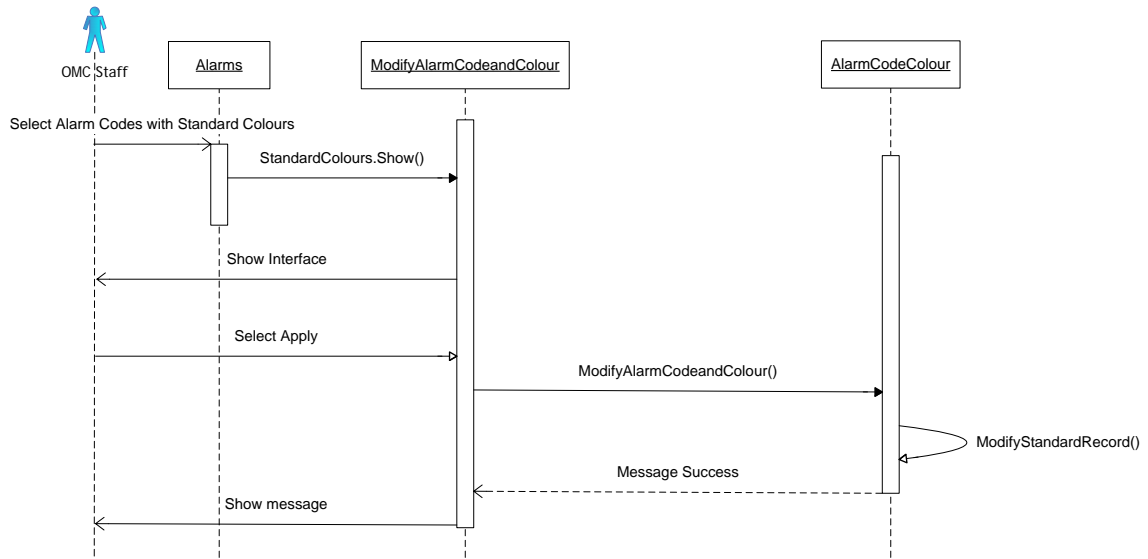


Figure D.5– Alarm Codes with Standard Colours - Apply

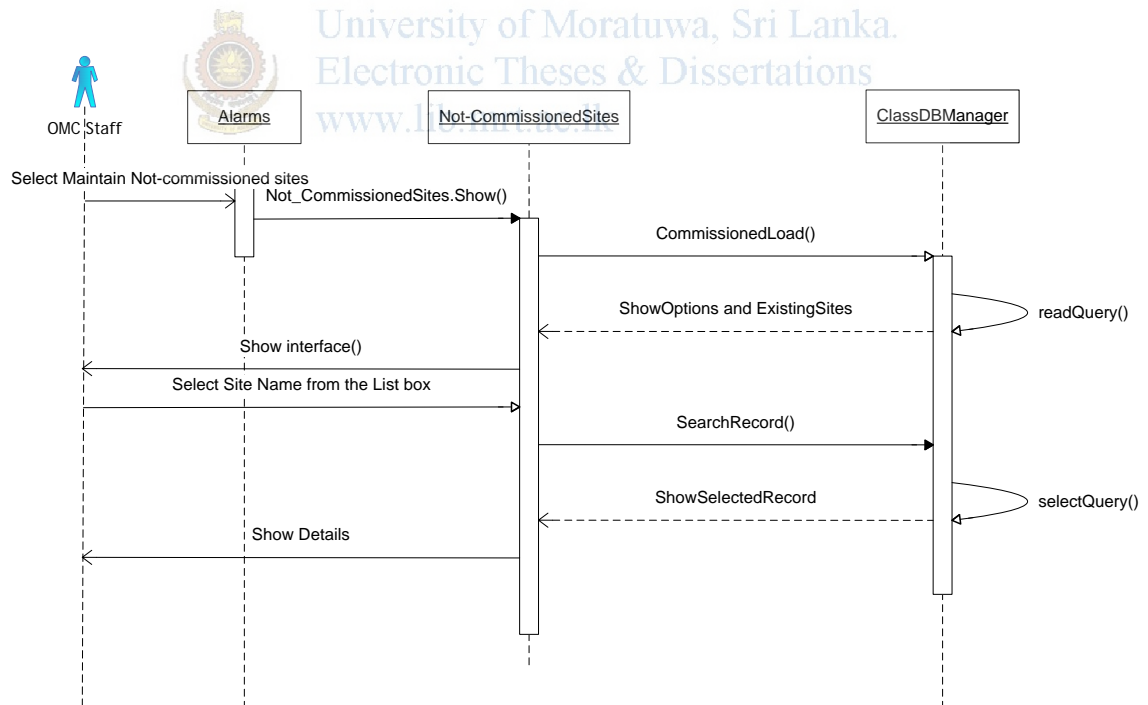


Figure D.6– Not-Commissioned Site Maintenance - Select

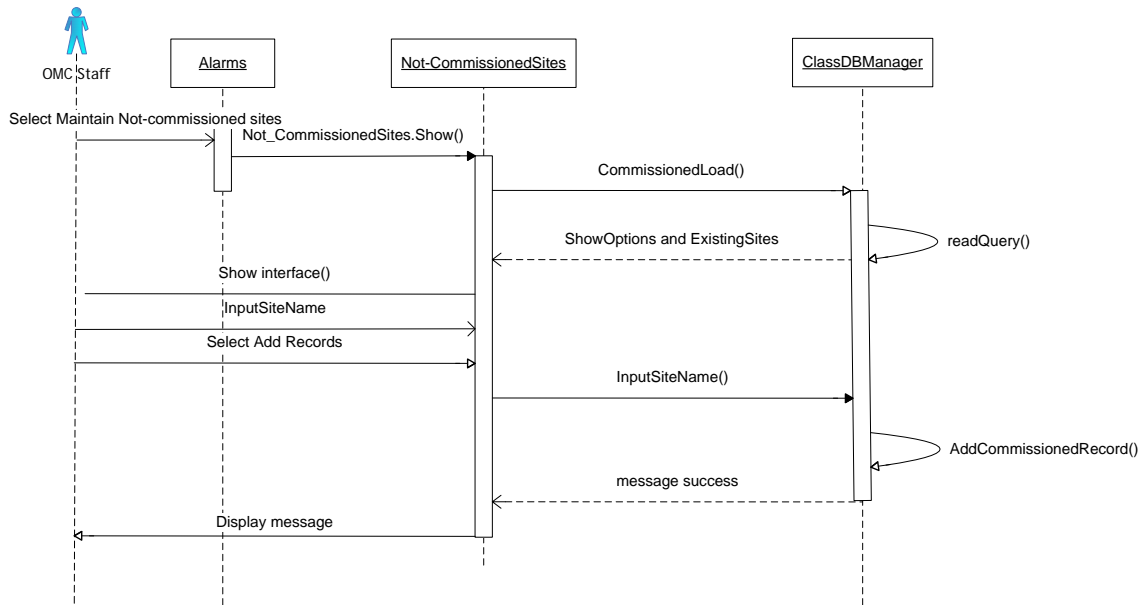


Figure D.7– Not-Commissioned Site Maintenance - Add

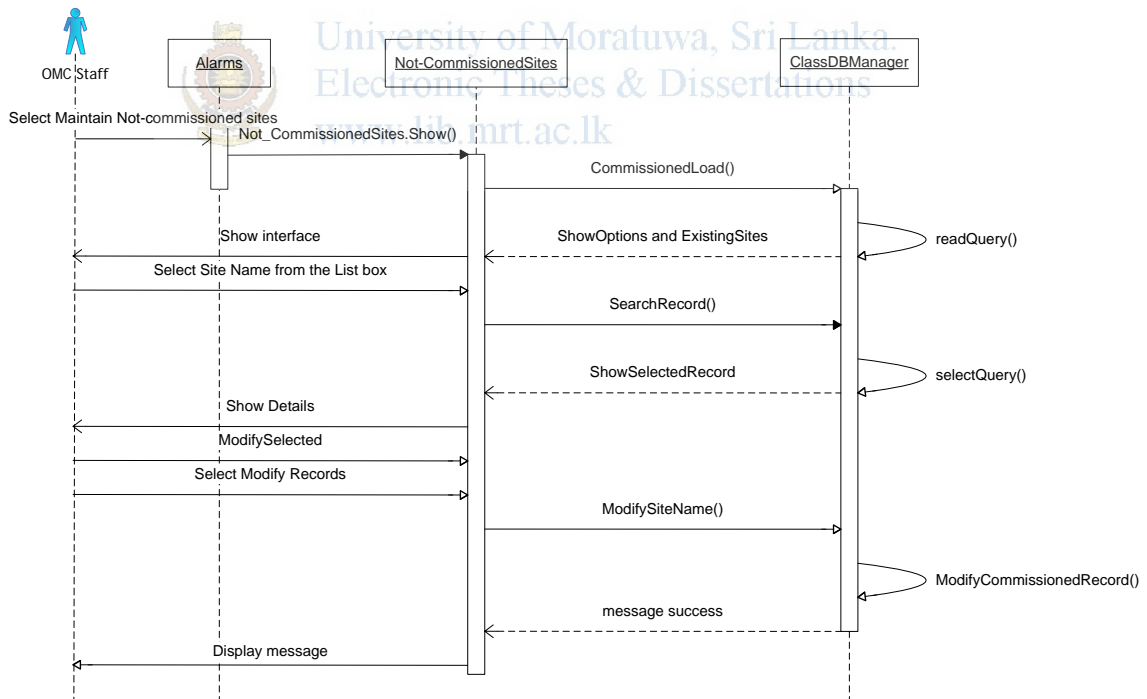


Figure D.8– Not-Commissioned Site Maintenance - Modify

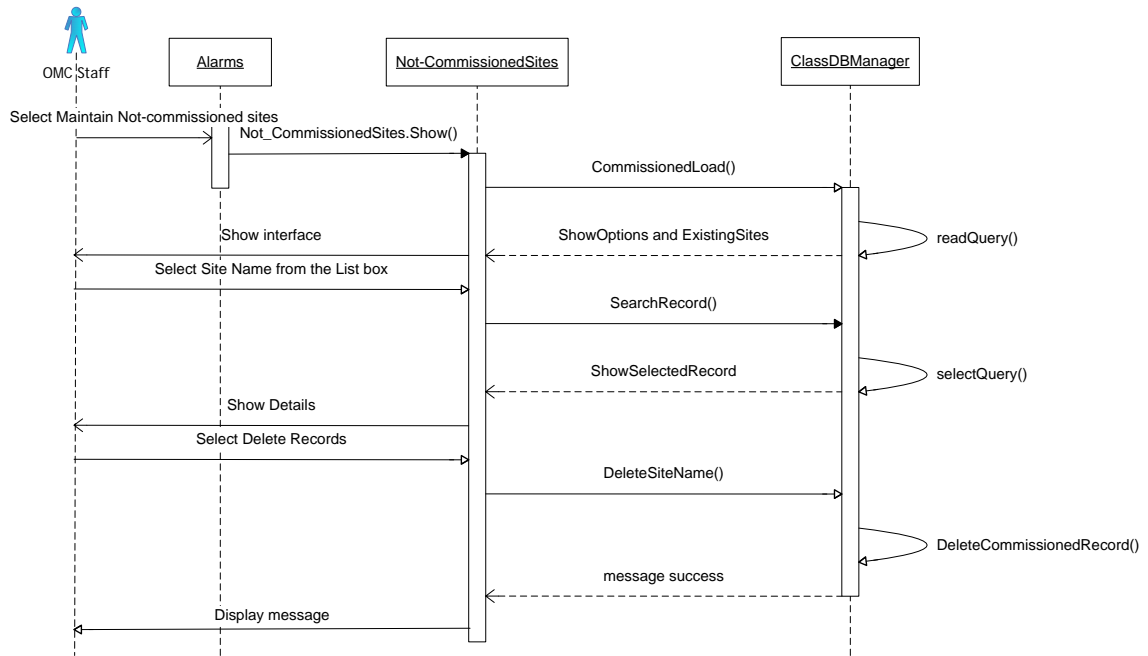


Figure D.9– Not-Commissioned Site Maintenance - Delete

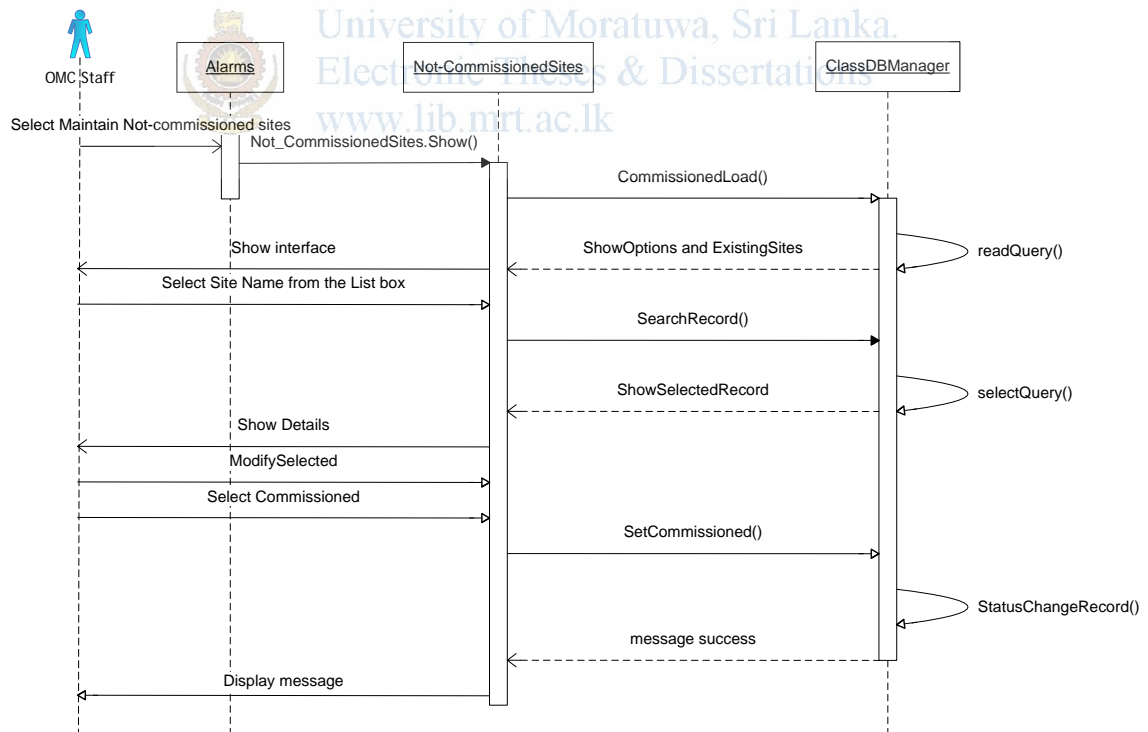


Figure D.10– Not-Commissioned Site Maintenance - Commissioned

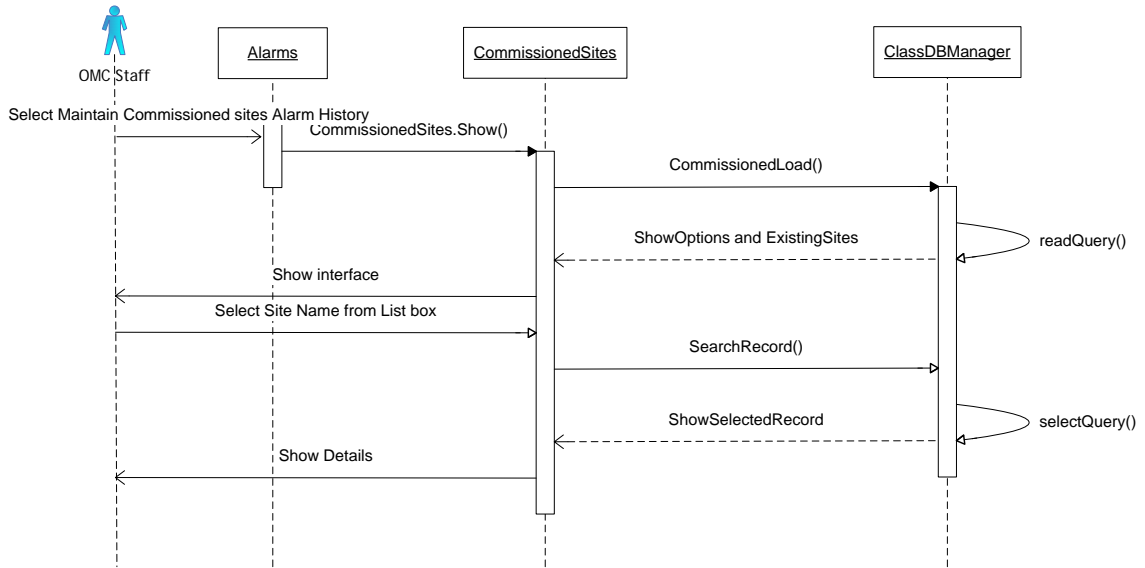


Figure D.11– Commissioned Site's Alarm History Maintenance- Select

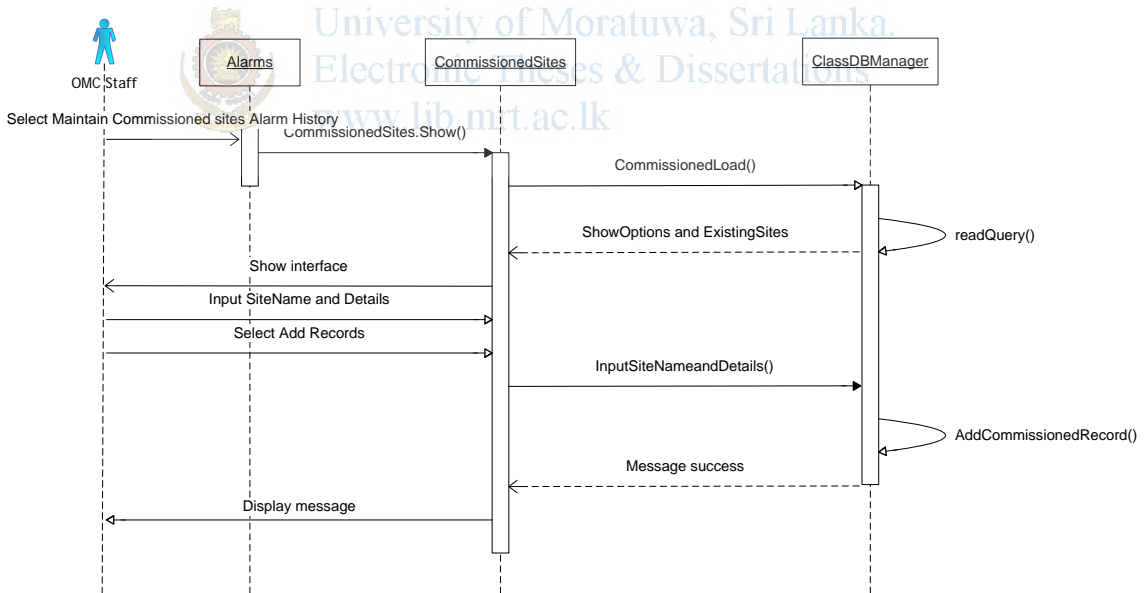


Figure D.12– Commissioned Site's Alarm History Maintenance- Add

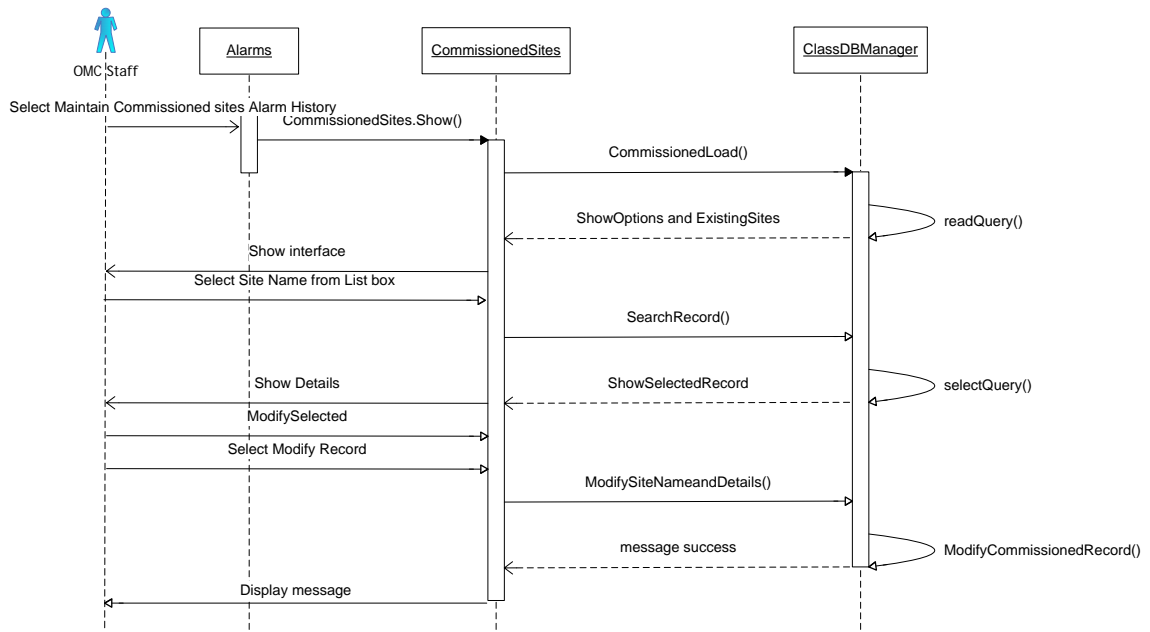


Figure D.13– Commissioned Site’s Alarm History Maintenance- Modify

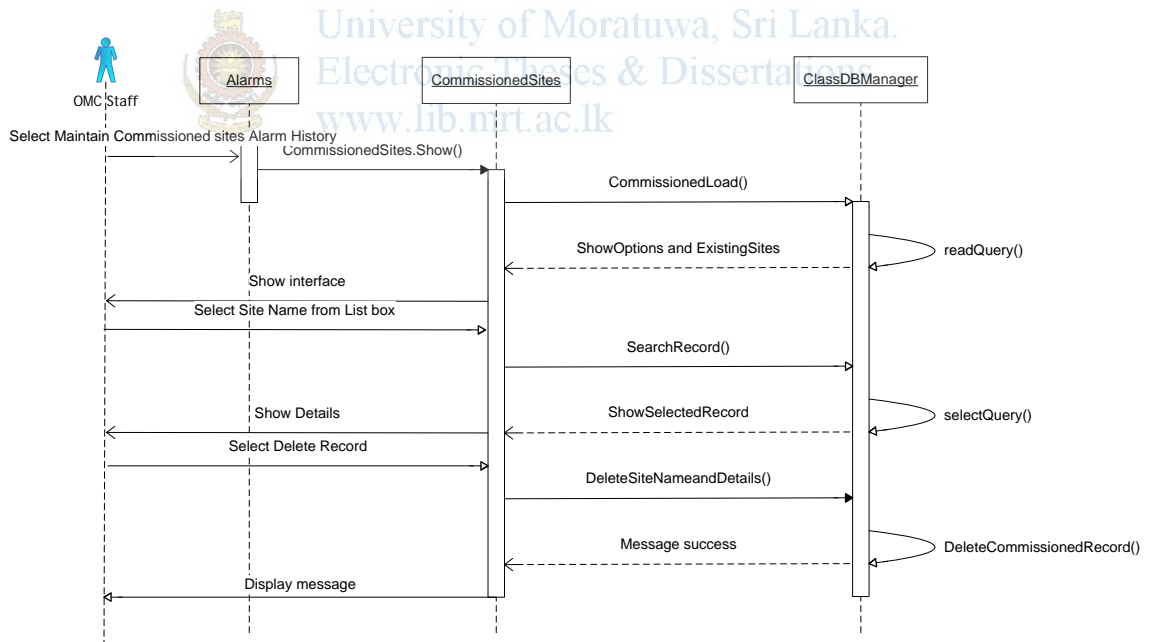


Figure D.14– Commissioned Site’s Alarm History Maintenance- Delete

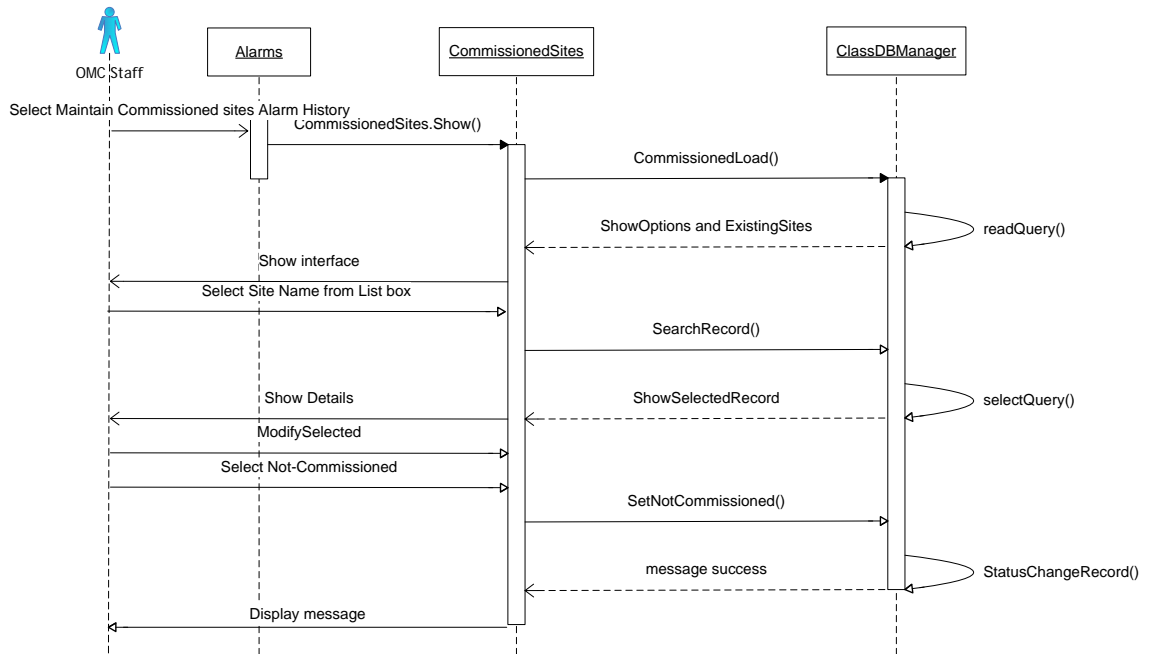


Figure D.15– Commissioned Site’s Alarm History Maintenance– Not-Commissioned

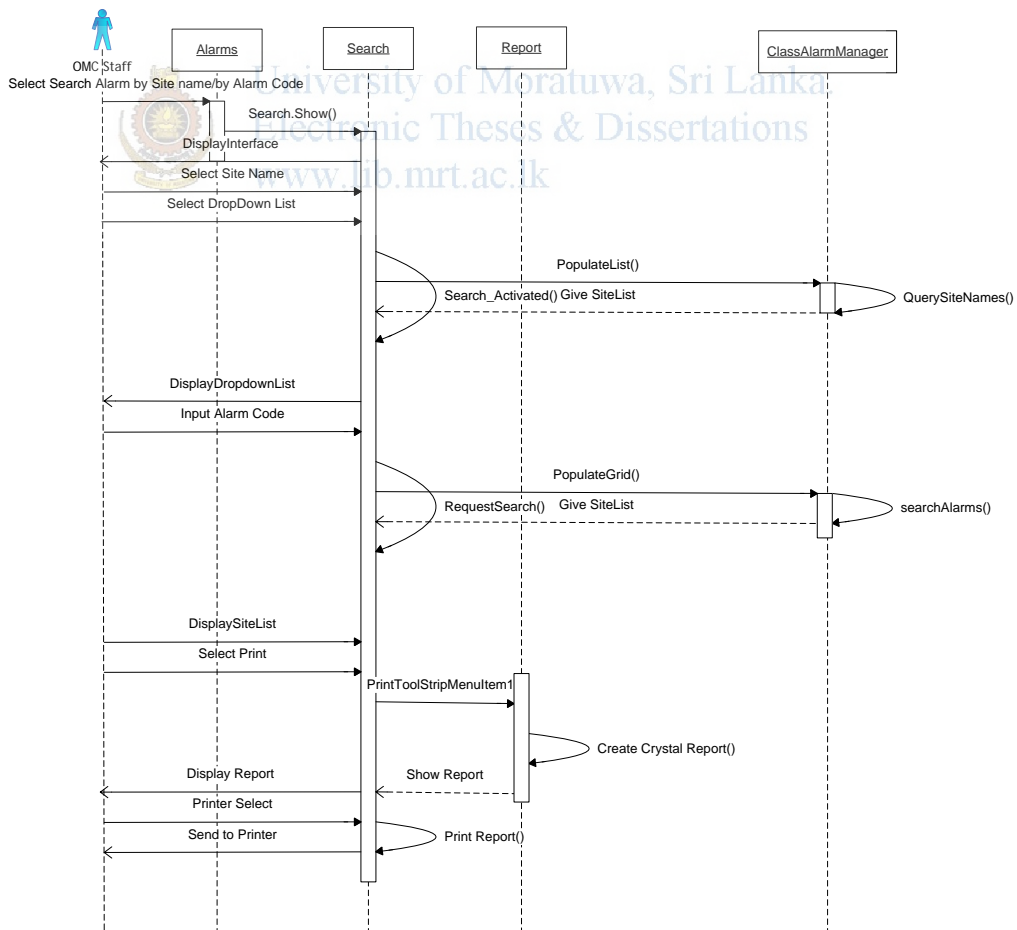


Figure D.16– Search Alarms by Site Name/ by Alarm Code

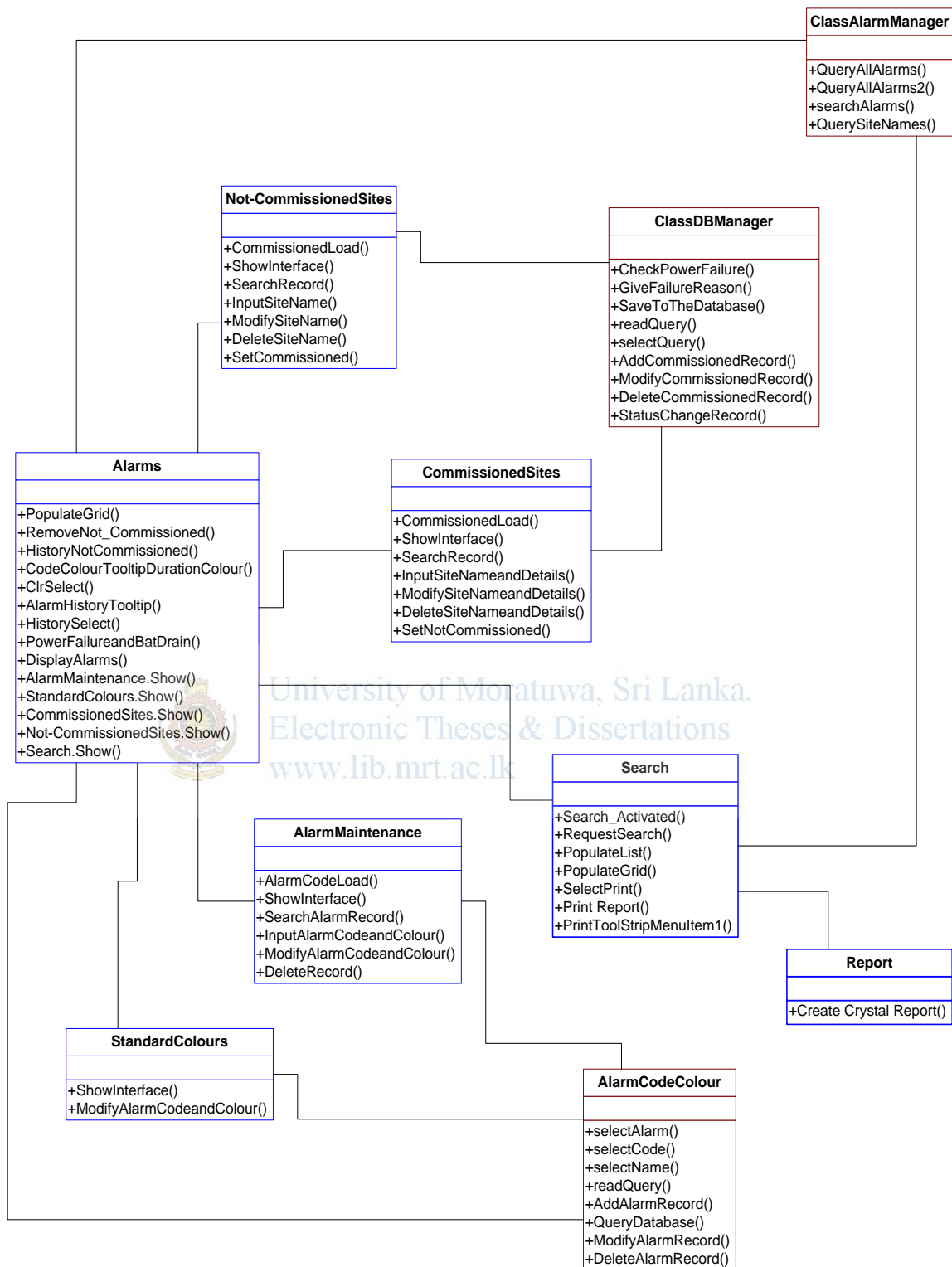


Figure D.17– Class Diagram

# Appendix E

## Database Design

dbo.Alarm: Table(omcr-wpl...DF)			
Column Name	Data Type	Allow Nulls	
AlarmCode	int	<input type="checkbox"/>	
AlarmName	varchar(50)	<input checked="" type="checkbox"/>	
ColourID	varchar(50)	<input type="checkbox"/>	
P_ID	int	<input type="checkbox"/>	
		<input type="checkbox"/>	

dbo.Colour: Table(omcr-w...DF)			
Column Name	Data Type	Allow Nulls	
ColourID	varchar(50)	<input type="checkbox"/>	
RColour	int	<input checked="" type="checkbox"/>	
GColour	int	<input checked="" type="checkbox"/>	
BColour	int	<input checked="" type="checkbox"/>	
RColourfont	int	<input checked="" type="checkbox"/>	
GColourfont	int	<input checked="" type="checkbox"/>	
BColourfont	int	<input checked="" type="checkbox"/>	
		<input type="checkbox"/>	

dbo.CommissionedSite: Ta...DF)			
Column Name	Data Type	Allow Nulls	
SiteID	uniqueidentifier	<input type="checkbox"/>	
SiteName	varchar(50)	<input type="checkbox"/>	
B_BankDuration	numeric(18, 0)	<input checked="" type="checkbox"/>	
AlarmHistory	varchar(50)	<input checked="" type="checkbox"/>	
Status	bit	<input checked="" type="checkbox"/>	
		<input type="checkbox"/>	

dbo.Priority: Table(omcr-...MDF)			
Column Name	Data Type	Allow Nulls	
P_ID	int	<input type="checkbox"/>	
Priority	varchar(50)	<input checked="" type="checkbox"/>	
		<input type="checkbox"/>	

Figure E.1 -Tables – Alarm, Colour, Commissioned and Priority

```

SELECT dbo.Alarm.AlarmCode, dbo.Alarm.AlarmName, dbo.Alarm.ColourID, dbo.Colour.RColour, dbo.Colour.GColour, dbo.Colour.BColour,
dbo.Colour.RColourfont, dbo.Colour.GColourfont, dbo.Colour.BColourfont, dbo.Priority.Priority
FROM dbo.Alarm INNER JOIN
dbo.Colour ON dbo.Alarm.ColourID = dbo.Colour.ColourID INNER JOIN
dbo.Priority ON dbo.Alarm.P_ID = dbo.Priority.P_ID

```

Figure E.2 -View\_ColourRecordQuery



```

dbo.AlarmColour_Delete: S...DF)
ALTER PROCEDURE dbo.AlarmColour_Delete
(
    @AlarmCode int
)
AS
DELETE FROM Alarm
WHERE AlarmCode = @AlarmCode

```

Figure E.3 -Stored Procedure 1-AlarmColour\_Delete

```

dbo.AlarmColour_Insert: S...DF)
ALTER PROCEDURE dbo.AlarmColour_Insert
(
    @AlarmCode int,
    @AlarmName varchar(50),
    @ColourID varchar(50),
    @P_ID int,
    @RColour int,
    @GColour int,
    @BColour int,
    @RColourfont int,
    @GColourfont int,
    @BColourfont int
)
AS
INSERT INTO Colour
(ColourID, Rcolour, Gcolour, Bcolour, Rcolourfont, Gcolourfont, Bcolourfont)
VALUES (@ColourID, @Rcolour, @Gcolour, @Bcolour, @RColourfont, @Gcolourfont, @BColourfont)
INSERT INTO Alarm
(AlarmCode, AlarmName, ColourID, P_ID)
VALUES (@AlarmCode, @AlarmName, @ColourID, @P_ID)

```

Figure E.4 -Stored Procedure 2- AlarmColour\_Insert

```

dbo.AlarmColour_InsertOnly...DF)
ALTER PROCEDURE dbo.AlarmColour_InsertOnlyCode
(
    @AlarmCode int,
    @AlarmName varchar(50),
    @ColourID varchar(50),
    @P_ID int
)
AS
INSERT INTO Alarm
(AlarmCode, AlarmName, ColourID, P_ID)
VALUES (@AlarmCode, @AlarmName, @ColourID, @P_ID)
UPDATE Alarm
SET ColourID=@ColourID
WHERE AlarmCode=@AlarmCode

```

Figure E.5 -Stored Procedure 3- AlarmColour\_InsertOnlyCode

```

dbo.AlarmColour_Modify: S...DF)
ALTER PROCEDURE dbo.AlarmColour_Modify
(
    @AlarmCode int,
    @AlarmName varchar(50),
    @ColourID varchar(50),
    @P_ID int,
    @RColour int,
    @GColour int,
    @BColour int,
    @RColourfont int,
    @GColourfont int,
    @BColourfont int
)
AS
INSERT INTO Colour
(ColourID, Rcolour, Gcolour, Bcolour, Rcolourfont, Gcolourfont, Bcolourfont)
VALUES (@ColourID, @Rcolour, @Gcolour, @Bcolour, @RColourfont, @Gcolourfont, @BColourfont)
UPDATE Alarm
SET AlarmCode=@AlarmCode,
AlarmName=@AlarmName,
ColourID=@ColourID,
P_ID=@P_ID
WHERE AlarmCode=@AlarmCode

```

Figure E.6 -Stored Procedure 4- AlarmColour\_Modify

```

dbo.AlarmColour_ModifyOn...F)
ALTER PROCEDURE dbo.AlarmColour_ModifyOnlyCode
(
    @AlarmCode      int,
    @AlarmName      varchar (50),
    @ColourID       varchar (50),
    @P_ID           int
)
AS
UPDATE Alarm
SET AlarmName=@AlarmName,
    ColourID=@ColourID,
    P_ID=@P_ID
WHERE AlarmCode=@AlarmCode

```

### Stored Procedure 5- AlarmColour\_ModifyOnlyCode

```

dbo.AlarmDetail_ComQuery...F)
ALTER PROCEDURE dbo.AlarmDetail_ComQuery
(
    @SiteID         uniqueidentifier
)
AS
SELECT SiteID,SiteName,B_BankDuration,AlarmHistory
FROM CommissionedSite
WHERE SiteID=@SiteID And Status = 0

```

### Stored Procedure 6- AlarmDetail\_ComQuery

```

dbo.AlarmDetail_ComSelec...F)
ALTER PROCEDURE dbo.AlarmDetail_ComSelectAll
AS
SELECT SiteID,SiteName,B_BankDuration,AlarmHistory
FROM CommissionedSite
WHERE Status = 0
ORDER BY SiteName

```

### Stored Procedure 7- AlarmDetail\_ComSelectAll

```

dbo.AlarmDetail_Delete: 5...DF)
ALTER PROCEDURE dbo.AlarmDetail_Delete
(
    @SiteID         uniqueidentifier
)
AS
DELETE FROM CommissionedSite
WHERE SiteID = @SiteID

```

### Stored Procedure 8- AlarmDetail\_Delete

```

dbo.AlarmDetail_Duration...DF)
ALTER PROCEDURE dbo.AlarmDetail_DurationQuery
(
    @SiteName      varchar (50)
)
AS
SELECT SiteID,SiteName,B_BankDuration,AlarmHistory
FROM CommissionedSite
WHERE SiteName=@SiteName

```

### Stored Procedure 9- AlarmDetail\_DurationQuery

```

dbo.AlarmDetail_Insert: S...DF)
ALTER PROCEDURE dbo.AlarmDetail_Insert
(
    @SiteID    uniqueidentifier,
    @SiteName  varchar(50),
    @B_BankDuration numeric(18, 0),
    @AlarmHistory varchar(50),
    @Status bit
)
AS
INSERT INTO CommissionedSite
(SiteID, SiteName, B_BankDuration, AlarmHistory, Status)
VALUES (@SiteID, @SiteName, @B_BankDuration, @AlarmHistory, @Status)

```

### Stored Procedure 10- AlarmDetail\_Insert

```

dbo.AlarmDetail_Modify: S...DF)
ALTER PROCEDURE dbo.AlarmDetail_Modify
(
    @SiteID    uniqueidentifier,
    @SiteName  varchar(50),
    @B_BankDuration numeric(18, 0),
    @AlarmHistory varchar(50),
    @Status bit
)
AS
update CommissionedSite
SET SiteName=@SiteName,
    B_BankDuration=@B_BankDuration,
    AlarmHistory=@AlarmHistory,
    Status=@Status
where SiteID=@SiteID

```

### Stored Procedure 11- AlarmDetail\_Modify



University of Moratuwa, Sri Lanka.  
Electronic Theses & Dissertations

```

dbo.AlarmDetail_NotComm...F)
ALTER PROCEDURE dbo.AlarmDetail_NotCommissionedQuery
(
    @SiteName  varchar(50)
)
AS
SELECT SiteID, SiteName, Status
FROM CommissionedSite
WHERE SiteName=@SiteName

```

### Stored Procedure 12- AlarmDetail\_NotCommissionedQuery

```

dbo.AlarmDetail_Query: S...DF)
ALTER PROCEDURE dbo.AlarmDetail_Query
(
    @SiteID    uniqueidentifier
)
AS
SELECT SiteID, SiteName
FROM CommissionedSite
WHERE SiteID=@SiteID And Status = 1

```

### Stored Procedure 13- AlarmDetail\_Query

```

dbo.AlarmDetail_SelectAl...DF)
ALTER PROCEDURE dbo.AlarmDetail_SelectAll
AS
SELECT SiteID, SiteName
FROM CommissionedSite
WHERE Status = 1
ORDER BY SiteName

```

### Stored Procedure 14- AlarmDetail\_SelectAll

```

dbo.AlarmDetail_SelectAll...DF)
ALTER PROCEDURE dbo.AlarmDetail_SelectAllforAdd
(
@SiteName varchar(50)
)
AS
SELECT SiteID,SiteName,B_BankDuration,AlarmHistory,Status
FROM CommissionedSite
WHERE SiteName=@SiteName

```

### Stored Procedure 15- AlarmDetail\_SelectAllforAdd

```

dbo.ColourAlarmQuery: Sto...DF)
ALTER PROCEDURE dbo.ColourAlarmQuery
(
@AlarmCode int
)
AS
SELECT ColourID, AlarmCode, AlarmName
FROM Alarm
WHERE AlarmCode=@AlarmCode

```

### Stored Procedure 16- ColourAlarmQuery

```

dbo.ColourOnlyQuery: Sto...DF)
ALTER PROCEDURE dbo.ColourOnlyQuery
(
@ColourID varchar(50)
)
AS
SELECT ColourID, Rcolour, Gcolour, Bcolour, Rcolourfont,Gcolourfont,Bcolourfont
FROM Colour
WHERE ColourID=@ColourID

```

### Stored Procedure 17- ColourOnlyQuery

```

dbo.ColourRecordIDQuery:...DF)
ALTER PROCEDURE dbo.ColourRecordIDQuery
(
@ColourID varchar(50)
)
AS
SELECT ColourID, Rcolour, Gcolour, Bcolour, Rcolourfont,Gcolourfont,Bcolourfont
FROM Colour
WHERE ColourID=@ColourID

```

### Stored Procedure 18- ColourRecordIDQuery

```

dbo.ColourRecordQuery: S...DF)
ALTER PROCEDURE dbo.ColourRecordQuery
(
@AlarmCode int
)
AS
SELECT ColourID, AlarmCode, AlarmName, Rcolour, Gcolour, Bcolour, Rcolourfont,Gcolourfont,Bcolourfont, Priority
FROM view_ColourRecordQuery
WHERE AlarmCode=@AlarmCode

```

### Stored Procedure 19- ColourRecordQuery

```

dbo.ColourRecordSelect: S...DF)
ALTER PROCEDURE dbo.ColourRecordSelect
AS
SELECT ColourID, AlarmCode, AlarmName
FROM Alarm
ORDER BY AlarmCode

```

### Stored Procedure 20- ColourRecordSelect

Interface Design

F.1 Show Alarms

AlarmCode	Date_Time	SiteName	Detail	Location
3861	9/17/2008 9:20 AM	Kakutara	Temperature Alarm	15id45
3861	9/16/2008 8:09 AM	Mabole	Temperature Alarm	12_id45
3861	9/16/2008 2:30 AM	Dehiwala	Temperature Alarm	82_id45
3861	12/12/2007	Borella	Temperature Alarm	12_id45
3862	9/16/2008 10:00 AM	Dehiwala2	Power Alarm	45_id61
3862	11/11/2007	Borella	Power Alarm	45_id61
6814	9/18/2008 9:30 AM	M/Lavinia	Fan Alarm2	16_id46
6814	9/18/2008 9:30 AM	Battaramulla	Fan Alarm2	16_id46
6817	9/18/2008 11:23 AM	Bambalapitiya	Fan Alarm	23_id8
6817	9/18/2008 9:30 AM	Grandpass	Fan Alarm	18_id46
6817	9/16/2008 5:43 AM	Malambe	Fan Alarm	15_id61
6859	9/18/2008 8:30 AM	Gampaha	Cell Break	93_id8
6859	9/17/2008 7:53 AM	Rajagiriya	Fan Alarm	49_id61
8194	9/18/2008 11:30 AM	Borella2	Cell Break	21_id45
8194	9/18/2008 10:00 AM	Negombo	Cell Break	7_id45
8194	9/18/2008 8:40 AM	Moratuwa	Cell Break	23_id8
8194	9/18/2008	Fort	Cell Break	23_id8
8196	9/18/2008 9:55 AM	Fort Station	Cell Break	67_id45
8196	9/18/2008 4:25 AM	Mahaapana	Cell Break	67_id45

AlarmCode	Date_Time	SiteName	Detail	Location
3861	9/16/2008 8:09 AM	Kadunuwela	Temperature Alarm	12_id45
3861	9/16/2008 2:30 AM	Kegalle	Temperature Alarm	82_id45
3862	B.Bank Duration -0hours, Failure case:suspect Power Failure and battery drain			
6814	9/18/2008 9:30 AM	Grigalthena	Fan Alarm	18_id46
6814	9/18/2008 9:30 AM	Kegalle	Fan Alarm2	16_id46
6814	9/18/2008 9:30 AM	Anuradhapura	Fan Alarm2	16_id46
6817	9/18/2008 11:23 AM	Gandara	Fan Alarm	23_id8
6817	9/17/2008 7:53 AM	Polonnaruwa	Fan Alarm	49_id61
6817	9/16/2008 5:43 AM	Trincomalee	Fan Alarm	15_id61
8194	9/18/2008 11:30 AM	Yajyantola	Cell Break	21_id45
8194	9/18/2008 8:40 AM	Hikkaduwa	Cell Break	23_id8
8194	9/18/2008 8:30 AM	Devundara	Cell Break	93_id8
8194	9/18/2008	Aluthgama	Cell Break	23_id8
8196	9/19/2008 10:00 AM	Gandara	Cell Break	7_id45
8196	9/19/2008 4:25 AM	Ranapana	Cell Break	67_id45
8196	9/17/2008 9:20 AM	Tangalle	Temperature Alarm	15id45

Alarm Monitor

Figure F.1 – Show Alarms

Figure F.1 shows the “HAM (Hutchison Alarm Monitoring) Alarm Monitor” of the HAM System. It is include with a Data Grid which allocate the maximum area of the GUI and Menu Strip which use to navigate other forms via main Alarm interface. Picture boxes are not including on this GUI as we have to use maximum available area for Alarm monitoring interface.

Control Name	Type	Width	Height	Back Colour	Text	Font	Font Colour
Alarms	Form	937	538	Lemon Chiffon	–	–	–
MenuStrip1	MenuStrip	929	24	Khaki	–	Tahoma font size 8.25	Black
LabelStop	Label	108	19	Lemon Chiffon	“Alarm Stopped”	Times New Roman font size 12 Style Bold	Blue
btnClose	Button	119	25	Lemon Chiffon	“Close”	Times New Roman font size 12 Style Bold	Blue

Table F.1 – Alarm Monitor



## F.2 Commissioned Site's Alarm History Maintenance

**Commissioned Site's Alarm History Maintenance**

SiteName	Bat. (h)	Alarm History
Aluthgama	36	Microwave Link errors
Borella	24	Power failure and battery drian
Browns Hill	28	Hikkaduwa DDF loose connection
Galle Face	18	Power failure and battery drian
Ginigathena	12	Check whether, Yatiyantota link failure
<b>Matalara</b>	<b>24</b>	<b>power failure and battery drain</b>
Monaragala	24	E1 errors
Tangalle	14	Link Errors
Upper Hantana	6	Link failure due to mist
Yatiyantota	12	Due to heavy lightning

**Site Name:** 57AD8688-8309-4E47-B755-98EFCDBC  
**Site Name:** Matalara  
**Battery Bank Duration:** 24  
**History Reason:** power failure and batte

Add Record  
 Modify Record  
 Not Commissioned  
 Delete Record  
 Exit

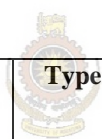
Commissioned Site Alarm History Maintenance

Figure F.2 – Commissioned Site's Alarm History Maintenance



Figure F.2 shows the “Commissioned Site’s Alarm History Maintenance” of the HAM System. It is include with Picture box with the Title bar at the top of the form. Right-bottom end of picture box is the Hutch Logo. Left side of the form is a list box which shows added records. Each selection of the list box is data query event and selected record from the database is shown on the right side text boxes of the form. Right-Bottom of the form there are buttons for Add records, Modify Record, Commissioned, Delete Record and Exit from the form window.

- When selecting the “Not Commissioned” button selected record is edited as Not Commissioned site and it will not shown on the “Commissioned Site’s Alarm History Maintenance” GUI anymore. It is shown on the “Not-Commissioned Maintenance” GUI only.
- Delete button position is slightly lower than other buttons to avoid deleting important records by mistakes
- The Top text box is for “SiteID” and it is Read-only Back colour is “Control”.
- Battery bank Duration is input box which accept only numeric values.



Control Name	Type	Width	Height	Back Colour	Text	Font	Font Colour
CommissionedSites	Form	718	519	Lemon Chiffon	–	–	–
TitlePictureBox	Picture Box	695	81	Logo2 Picture	–	–	–
LabelTitle	Label	444	24	Lemon Chiffon	“Commissioned Site’s Alarm History Maintenance”	Times New Roman font size 15.75 Style Bold	Blue
ShowGrid	List Box	456	384	Window	–	MS Sans Serif font size 8.25	Black
GroupBox1	Group Box	228	123	Khaki	–	–	–
txtSiteID	Textbox	200	20	Control	SiteID	MS Sans Serif font size 8.25	Black
LabelSiteName	Label	65	13	Khaki	“Site Name”	MS Sans Serif font size 8.25 Style Bold	Black
txtSiteName	Textbox	141	20	Window	SiteName	MS Sans Serif font size 8.25	Black
LabelBBDuration	Label	132	13	Khaki	“Battery Bank Duration”	MS Sans Serif font size 8.25 Style Bold	Black
txtDuration	Textbox	68	20	Window	B_BankDuration	MS Sans Serif font size 8.25	Black
LabelHistory	Label	93	13	Khaki	“History Reason”	MS Sans Serif font size 8.25 Style Bold	Black



txtHistory	Textbox	118	20	Window	AlarmHistory	MS Sans Serif font size 8.25	Black
LabelMsg	Label	118	13	Lemon Chiffon	“ ”	MS Sans Serif font size 8.25	Black
btnAddRecord	Button	135	29	Lemon Chiffon	“Add Record”	Times New Roman font size 11 Style Bold	Blue
btnModifyRecord	Button	135	29	Lemon Chiffon	“Modify Record”	Times New Roman font size 11 Style Bold	Blue
btnNotCommissioned	Button	135	29	Lemon Chiffon	“Not Commissioned”	Times New Roman font size 10 Style Bold	Blue
btnDeleteRecord	Button	135	29	Lemon Chiffon	“Delete Record”	Times New Roman font size 11 Style Bold	Blue
BtnExit	Button	135	29	Lemon Chiffon	“Exit”	Times New Roman font size 12 Style Bold	Blue

Table F.2 - Commissioned Site’s Alarm History Maintenance



University of Moratuwa, Sri Lanka.  
Electronic Theses & Dissertations  
[www.lib.mrt.ac.lk](http://www.lib.mrt.ac.lk)

### F.3 Alarm Maintenance

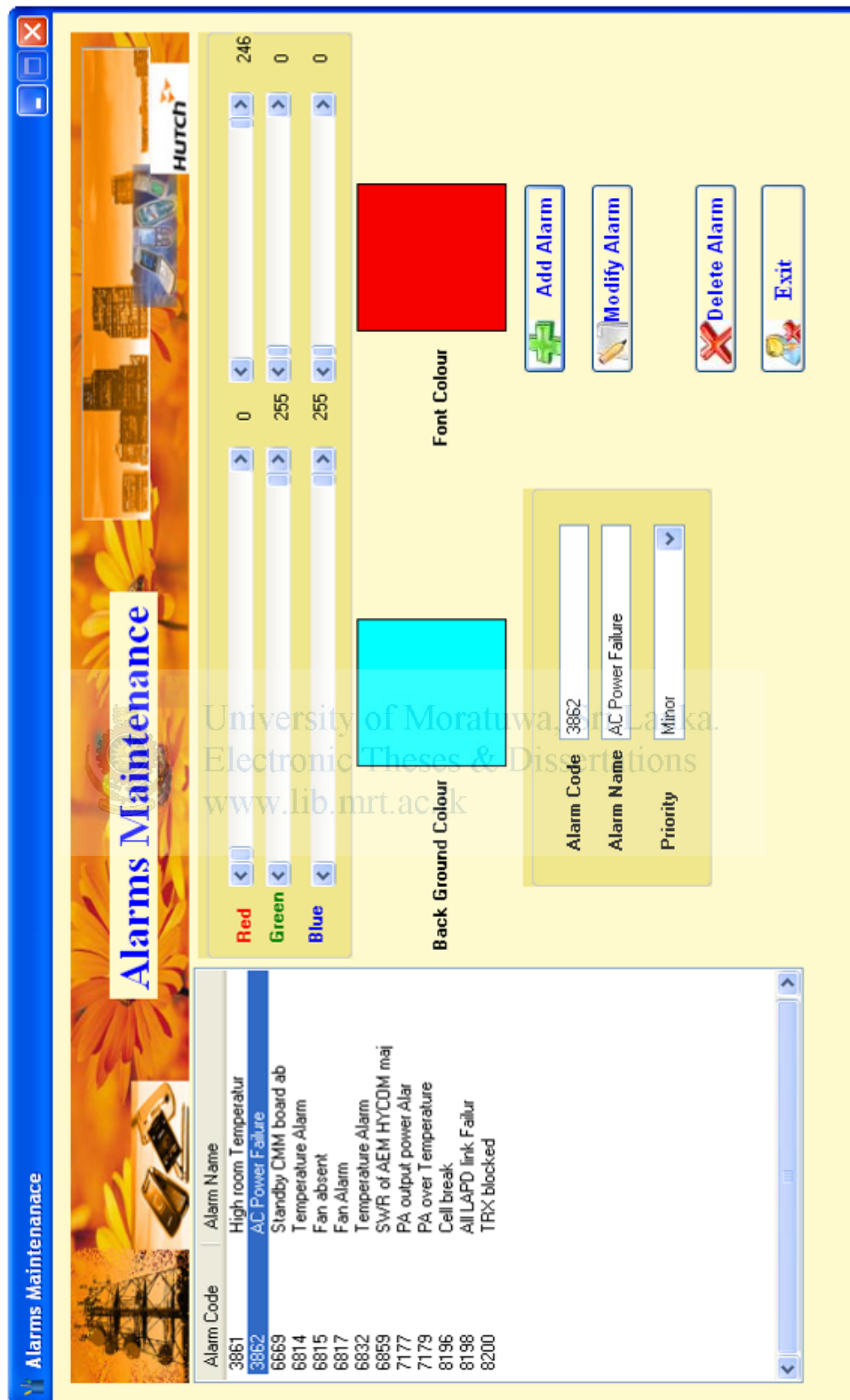


Figure F.3 – Alarm Maintenance

Figure F.3 shows the “Alarm Maintenance” of HAM System. It is include with Picture box with the Title bar at the top of the form. Right-bottom end of picture box is

the Hutch Logo. Left side of the form is a list box which shows added records. Each selection of the list box is data query event and Alarm Code and colours of selected record from the database is shown on the right side text boxes of the form.

Right-Bottom of the form there are buttons for Add Alarm, Modify Alarm, Delete Alarm and Exit from the form window.

- Delete button position is slightly lower than other buttons to avoid deleting important records by mistakes
- Horizontal Scroll bars are used to add or change colour resolution of Background and Font Colours by Red, Green and Blue colours.
- Selected Background and font colours are shown on the two Labels located on the Right-middle of the form.
- Priority level can select using Drop down list box located in Group Box.

Control Name	Type	Width	Height	Back Colour	Text	Font	Font Colour
AlarmMaintenance	Form	936	568	Lemon Chiffon	-	-	-
TitlePictureBox	Picture Box	903	79	Logo2 Picture	-	-	-
LabelTitle	Label	272	32	Lemon Chiffon	“Alarm Maintenance”	Times New Roman font size 21.75 Style Bold	Blue
ShowList	List Box	278	407	Window	-	MS Sans Serif font size 8.25	Black
GroupBox1	Group Box	619	103	Khaki	-	-	-
LabelRed	Label	30	13	Khaki	“Red”	MS Sans Serif font size 8.25 Style Bold	Red
LabelGreen	Label	30	13	Khaki	“Green”	MS Sans Serif font size 8.25 Style Bold	Green
LabelBlue	Label	30	13	Khaki	“Blue”	MS Sans Serif font size 8.25 Style Bold	Blue
redHBar	HScroll Bar	294	17	-	-	-	-
greenHBar	HScroll Bar	294	17	-	-	-	-
blueHBar	HScroll Bar	294	17	-	-	-	-
redHBarfont	HScroll Bar	194	17	-	-	-	-
greenHBarfont	HScroll Bar	194	17	-	-	-	-
blueHBarfont	HScroll Bar	194	17	-	-	-	-

redHbarVal	Label	13	13	Khaki	0	MS Sans Serif font size 8.25	Black
greenHbarVal	Label	13	13	Khaki	0	MS Sans Serif font size 8.25	Black
blueHbarVal	Label	13	13	Khaki	0	MS Sans Serif font size 8.25	Black
redHbarValfont	Label	13	13	Khaki	0	MS Sans Serif font size 8.25	Black
greenHbarValfont	Label	13	13	Khaki	0	MS Sans Serif font size 8.25	Black
blueHbarValfont	Label	13	13	Khaki	0	MS Sans Serif font size 8.25	Black
LabelBackClr	Label	121	13	Lemon Chiffon	“Back Ground Colour”	MS Sans Serif font size 8.25 Style Bold	Black
Display	Label	424	203	Lemon Chiffon	–	–	–
LabelFontClr	Label	121	13	Lemon Chiffon	“Font Colour”	MS Sans Serif font size 8.25 Style Bold	Black
Displayfont	Label	424	203	Lemon Chiffon	–	–	–
GroupBox2	Group Box	266	126	Khaki	–	–	–
LabelAlarmCode	Label	71	27	Khaki	“Alarm Code”	MS Sans Serif font size 8.25 Style Bold	Black
AlarmCode	Textbox	144	20	Window	AlarmCode	MS Sans Serif font size 8.25	Black
LabelAlarmName	Label	74	13	Khaki	“Alarm Name”	MS Sans Serif font size 8.25 Style Bold	Black
AlarmName	Textbox	144	20	Window	AlarmName	MS Sans Serif font size 8.25	Black
LabelPriority	Label	46	13	Khaki	“Priority”	MS Sans Serif font size 8.25 Style Bold	Black
txtPriority	Textbox	144	21	Window	–	MS Sans Serif font size 8.25	Black
LabelMsg	Label	181	13	Lemon Chiffon	“ ”	MS Sans Serif font size 8.25	Black
btnAddRecord	Button	137	29	Lemon Chiffon	“Add Alarm”	Times New Roman font size 9.75 Style Bold	Blue
btnModifyRecord	Button	137	29	Lemon Chiffon	“Modify Alarm”	Times New Roman font size 9.75 Style Bold	Blue
btnDeleteRecord	Button	137	29	Lemon Chiffon	“Delete Alarm”	Times New Roman font size 9.75 Style Bold	Blue
BtnExit	Button	135	29	Lemon Chiffon	“Exit”	Times New Roman font size 12 Style Bold	Blue

Table F.3 – Alarm Maintenance

## F.4 – Standard Colours



Figure F.4 –Standard Colours

Above figure F.4 shows the “Standard Colours” of HAM System. It is include with Standard Background colours for 14 Alarm Codes as System Requirement Specification. Once applying given standard colours they are added or modify the colour scheme by using Control array.

Control Name	Type	Width	Height	Back Colour	Text	Font	Font Colour
StandardColours	Form	641	512	Lemon Chiffon	–	–	–
TitlePictureBox	Picture Box	592	63	Logo2 Picture	–	–	–
LabelTitle	Label	232	32	Lemon Chiffon	“Standard Colours”	Times New Roman font size 21.75 Style Bold	Blue
GroupBox1	Group Box	595	330	Khaki	–	–	–
Label0	Label	100	36	BlueViolet	–	–	–
Label1	Label	100	36	Aqua	–	–	–
Label2	Label	100	36	Red	–	–	–
Label3	Label	100	36	Yellow	–	–	–
Label4	Label	100	36	Gold	–	–	–

Label5	Label	100	36	Red	-	-	-
Label6	Label	100	36	Red	-	-	-
Label7	Label	100	36	Yellow	-	-	-
Label8	Label	100	36	Maroon	-	-	-
Label9	Label	100	36	Maroon	-	-	-
Label10	Label	100	36	DarkGray	-	-	-
Label11	Label	100	36	Pink	-	-	-
Label12	Label	100	36	Gold	-	-	-
Label13	Label	100	36	GreenYellow	-	-	-
Label15	Label	147	13	Khaki	“High Room Temperature Alarm”	Ms Sans Serif font size 8.25	Black
Label16	Label	147	13	Khaki	“AC Power Failure”	Ms Sans Serif font size 8.25	Black
Label17	Label	147	13	Khaki	“Cell break”	Ms Sans Serif font size 8.25	Black
Label18	Label	147	13	Khaki	“Fan Alarm”	Ms Sans Serif font size 8.25	Black
Label19	Label	147	13	Khaki	“Temperature Alarm”	Ms Sans Serif font size 8.25	Black
Label20	Label	147	13	Khaki	“All LAPD link Failure”	Ms Sans Serif font size 8.25	Black
Label21	Label	147	13	Khaki	“TRx blocked”	Ms Sans Serif font size 8.25	Black
Label22	Label	147	13	Khaki	“Fan absent”	Ms Sans Serif font size 8.25	Black
Label23	Label	147	13	Khaki	“PA output power Alarm”	Ms Sans Serif font size 8.25	Black
Label24	Label	147	13	Khaki	“PA over Temperature Alarm”	Ms Sans Serif font size 8.25	Black
Label25	Label	147	13	Khaki	“Standby CMM board abnormal”	Ms Sans Serif font size 8.25	Black
Label26	Label	147	13	Khaki	“SWR of AEM HYCOM major”	Ms Sans Serif font size 8.25	Black
Label27	Label	147	13	Khaki	“Temperature Alarm”	Ms Sans Serif font size 8.25	Black
TextCode0	Textbox	100	20	Control	“3861”	Ms Sans Serif font size 8.25	Black
TextCode1	Textbox	100	20	Control	“3862”	Ms Sans Serif font size 8.25	Black
TextCode2	Textbox	100	20	Control	“8196”	Ms Sans Serif font size 8.25	Black
TextCode3	Textbox	100	20	Control	“6817”	Ms Sans Serif font size 8.25	Black
TextCode4	Textbox	100	20	Control	“6814”	Ms Sans Serif font size 8.25	Black
TextCode5	Textbox	100	20	Control	“8198”	Ms Sans Serif font size 8.25	Black
TextCode6	Textbox	100	20	Control	“8200”	Ms Sans Serif font size 8.25	Black
TextCode7	Textbox	100	20	Control	“6815”	Ms Sans Serif font size 8.25	Black
TextCode8	Textbox	100	20	Control	“7177”	Ms Sans Serif font size 8.25	Black

						font size 8.25	
TextCode9	Textbox	100	20	Control	“7179”	Ms Sans Serif font size 8.25	Black
TextCode10	Textbox	100	20	Control	“6669”	Ms Sans Serif font size 8.25	Black
TextCode11	Textbox	100	20	Control	“6859”	Ms Sans Serif font size 8.25	Black
TextCode12	Textbox	100	20	Control	“6832”	Ms Sans Serif font size 8.25	Black
TextCodeMinor	Textbox	100	20	Control	“Other minor Alarms”	Ms Sans Serif font size 8.25	Black
Labelmsg	Label	168	13	Lemon Chiffon	“Wait until Modify Alarm Codes. . . .”	Ms Sans Serif font size 8.25	Black
btnApply	Button	91	31	Lemon Chiffon	“Apply”	Times New Roman font size 12 Style Bold	Blue
btnExit	Button	91	31	Lemon Chiffon	“Exit”	Times New Roman font size 12 Style Bold	Blue

Table F.4 – Standard Colours

### F.5 - Search Alarms by Site Name/ by Alarm Code

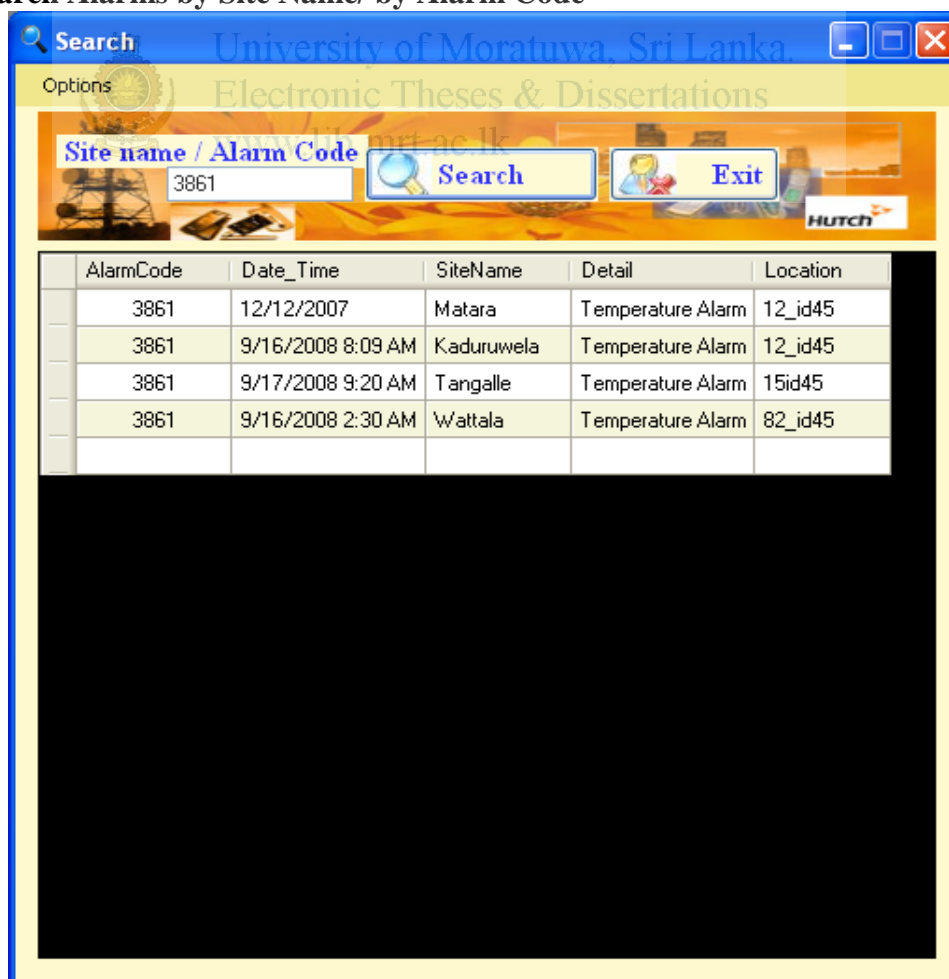


Figure F.5 - Search Alarms by Site Name/ by Alarm Code

Above figure shows the “Search” GUI of HAM System. It is including with Menu Strip, Input box which accept both “Alarm Code” and “Site Name”. AlarmGrid is shown selected Details of Records.


Control Name	Type	Width	Height	Back Colour	Text	Font	Font Colour
Search	Form	513	553	Lemon Chiffon	–	–	–
MenuStrip1	Menu Strip	481	24	Khaki	–	Tahoma font size 8.25	Black
TitlePictureBox	Picture Box	481	73	Logo1 Picture	–	–	–
AlarmGrid	Data Grid View	481	401	Black	–	MS Sans Serif font size 8.25	Black
LabelSearch	Label	167	19	Lemon Chiffon	Site name / Alarm Code	Times New Roman font size 12 Style Bold	Blue
btnSearchQuery	 Button	125	31	Lemon Chiffon	“Search”	Times New Roman font size 11 Style Bold	Blue
BtnExit	Button	91	31	Lemon Chiffon	“Exit”	Times New Roman font size 12 Style Bold	Blue

Table F.5 - Search Alarms by Site Name/ by Alarm Code



## Appendix G

### G.1 Test Case – Alarm Maintenance - Insert

Test Case ID	3			
Tested Component	Add Alarm Code			
Tested Area	Functionality			
Purpose	User can Add new Alarm Codes			
Prerequisites	Alarm Code should not existing			
Test Data	Alarm Code = { valid, existing, string, empty }			
Test Case Description				
No.	Test Case	Sample Data	Expected output	Results
1	Input Alarm Code on Input box. Send “Add Alarm”.	Alarm Code: 3862 , Alarm Name: power failure alarm, Priority: Critical	Show added Records on list box. Give message as "Alarm Code added successfully"	Pass
2	Input existing Alarm Code on Input box. Send “Add Alarm”.	Alarm Code: 3862 , Alarm Name: power failure alarm, Priority: Critical	Show Message box "Alarm Already exists" Give message as " Alarm Code Insertion Failed"	Pass
3	Input string as Alarm Code on Input box. Send “Add Alarm”.	Alarm Code: 3862A , Alarm Name: power failure alarm, Priority: Critical	Give message as "Please Enter numeric value for the Alarm Code"	Pass
4	Add empty record. Send “Add Alarm”.	Alarm Code: Alarm Name: Priority:	Error message "Please Enter numeric value for the Alarm Code" should be displayed.	Pass

### G.2 Test Case – Alarm Maintenance - Modify

Test Case ID	4			
Tested Component	Modify Alarm Code			
Tested Area	Functionality			
Purpose	User can Modify selected Alarm Code			
Prerequisites	Alarm Code should existing			
Test Data	Alarm Code = { valid, new Alarm Code, string, empty }			
Test Case Description				
No.	Test Case	Sample Data	Expected output	Results
1	Select the Alarm Code from the list box Edit Alarm Code	Alarm Code: 3862 , Alarm Name: AC power,	Show modified Records on list box Give message as "Alarm Code modified"	Pass


	details on Input box. Send "Modify Alarm".	Priority: Major	successfully"	
2	Select the Alarm Code from the list box Edit new Alarm Code on Input box. Send "Modify Alarm".	Alarm Code: 3861 , Alarm Name: Temperature alarm, Priority: Minor	Show Message box "You can add the Alarm Code, instead of modify " Give message as "Alarm Code modification Failed"	Pass
3	Select the Alarm Code from the list box Edit string as Alarm Code on Input box. Send "Add Alarm".	Alarm Code: 3861A , Alarm Name: Temperature alarm, Priority: Minor	Give message as "Please Enter numeric value for the Alarm Code"	Pass
4	Select the Alarm Code from the list box Edit empty record. Send "Modify Alarm".	Alarm Code: Alarm Name: Priority:	Error message "Please Enter numeric value for the Alarm Code" should be displayed.	Pass

### G.3 Test Case – Alarm Maintenance - Delete

Test Case ID	5			
Tested Component	Delete Alarm Code			
Tested Area	Functionality			
Purpose	User can Delete Alarm Code			
Prerequisites	Alarm Code should existing			
Test Data	Alarm Code = { valid, invalid, empty }			
Test Case Description				
No.	Test Case	Sample Data	Expected output	Results
1	Select the Alarm Code. from the list box Send "Delete Alarm".	Alarm Code: 3862 , Alarm Name: AC power , Priority: Major	Message Box show "Are you Sure, You want to Delete"	Pass
			Send Yes. Clear Records of list boxes Give message as "Alarm Code '3862' deleted successfully "	Pass
			Send No Give message as "Alarm Code deletion aborted".	Pass
2	Input invalid Alarm Code Send "Delete	Alarm Code: 3864 , Alarm Name:	Error message "'3864' not existing , Alarm Code deletion failed" should be displayed.	Pass

	Alarm”.	AC power , Priority: Major		
3	Input empty Alarm Code Send “Delete Alarm”.	Alarm Code: Alarm Name: Priority:	Error message "Please Enter numeric value for the Alarm Code" should be displayed.	Pass

#### G.4 Test Case – Standard Colours- Apply

Test Case ID	6			
Tested Component	Add/ Modify to Standard Alarm Codes			
Tested Area	Functionality			
Purpose	User can Add/Modify to Standard Alarm Codes			
Prerequisites				
Test Case Description				
No.	Test Case	Sample Data	Expected output	Results
1	Select “Alarm Codes with Standard Colours”	–	“Standard Colours” GUI should be given	Pass
	 Send “Apply”.	–	Message box "Are You sure, You want to modify"	Pass
			Send Yes. Give message “Alarm Code Modified Successfully” At “Alarm Maintenance” form, can see Standard Alarm Codes are Modified.	Pass
			Send No. Give message "Alarm Code Modification canceled"	Pass

### G.5 Test Case – Not-Commissioned Site Maintenance -Select

Test Case ID	7			
Tested Component	Select Site Name			
Tested Area	Functionality			
Purpose	User can select Site Name and Its records are shown on input box for editing purpose.			
Prerequisites	Site Name stored as Not-commissioned Status="True"			
Test Data				
Test Case Description				
No.	Test Case	Sample Data	Expected output	Results
1	Select "Maintain Not-Commissioned Sites"	_	"Not-Commissioned Site Maintenance" GUI should be given	Pass
2	Select the Site Name from the list box	_	Search records of selected Site Name and display on relevant input box  Input Box: Site Name	Pass

### G.6 Test Case – Not-Commissioned Site Maintenance - Insert

Test Case ID	8			
Tested Component	Add Record			
Tested Area	Functionality			
Purpose	User can Add new Site Names			
Prerequisites	Site Name should not existing in Commissioned or Not-Commissioned records			
Test Data	Site Name = { valid, existing, empty }			
Test Case Description				
No.	Test Case	Sample Data	Expected output	Results
1	Input Site Name on Input box. Send "Add Record".	Site Name: Borella	Show added Records on list box. Give message as "Site Name added successfully"	Pass
2	Input existing Site Name on Input box. Send "Add Record".	Site Name: Borella	Show Message box "Site already exists in Not-Commissioned Table" Or "Site already exists in Commissioned Table". Give message as "Site Name addition Failed"	Pass
3	Add empty record. Send "Add Record".	Site Name:	Error message "Sorry! Required fields cannot be empty" should be displayed.	Pass

### G.7 Test Case – Not-Commissioned Site Maintenance - Modify

Test Case ID	9			
Tested Component	Modify Record			
Tested Area	Functionality			
Purpose	User can Modify selected Site Name			
Prerequisites	Site Name stored as Not-commissioned Status="True"			
Test Data	Site Name = { valid, existing, empty }			
Test Case Description				
No.	Test Case	Sample Data	Expected output	Results
1	Select the Site Name from the list box. Edit Site Name on Input box. Send "Modify Record".	Site Name: Borella_2	Show Records add on list box. Give message as "Site Name modified successfully"	Pass
2	Select the Site Name from the list box. Edit existing Site Name on Input box. Send "Modify Record".	Site Name: Borella	Show Message box "Site already exists in Not-Commissioned Table" Or "Site already exists in Commissioned Table". Give message as "Site Name modification Failed"	Pass
3	Select the Site Name from the list box. Edit empty record. Send "Modify Record".	Site Name:	Error message "Sorry! Required fields cannot be empty" should be displayed.	Pass

### G.8 Test Case – Not-Commissioned Site Maintenance - Commissioned

Test Case ID	10			
Tested Component	Modify Record			
Tested Area	Functionality			
Purpose	User can Modify Not-Commissioned Sites as Commissioned			
Prerequisites	Site Name stored as Not-commissioned Status="True"			
Test Data	Site Name = { valid, existing, empty }			
Test Case Description				
No.	Test Case	Sample Data	Expected output	Results
1	Select the Site Name from the list box. Send "Commissioned".	Site Name: Borella_2	Clear Record from list box. Give message as "Site added to Commissioned"	Pass
2	Edit existing Site Name on Input box. Send	Site Name: Borella_2	Show Message box "Site already exists in Not-Commissioned Table"	Pass

	“Commissioned”.		Or “Site already exists in Commissioned Table”. Give message as "Site Name modification Failed"	
3	Edit empty record. Send “Commissioned”.	Site Name:	Error message "Sorry! Required fields cannot be empty" should be displayed.	Pass

### G.9 Test Case – Not-Commissioned Site Maintenance - Delete

Test Case ID		11		
Tested Component		Delete Record		
Tested Area		Functionality		
Purpose		User can Delete Not-Commissioned Sites		
Prerequisites		Site Name stored as Not-commissioned Status=“True”		
Test Data		Site Name = { valid, invalid, empty }		
Test Case Description				
No.	Test Case	Sample Data	Expected output	Results
1	Select the site Name. Send “Delete Record”.	Site Name: Borella	Message Box show "Are you Sure, You want to Delete" Send Yes. Clear Record from list box Give message as "Site 'Borella' deleted successfully".	Pass
			Send No Give message as "Site Name deletion aborted".	Pass
2	Input not existing Site Name Send “Delete Record”.	Site Name: Matara_2	Error message "Site 'Matara_2' not existing" should be displayed.	Pass
3	Input empty Site Name Send “Delete Record”.	Site Name:	Error message "Sorry! Required fields cannot be empty" should be displayed.	Pass

### G.10 Test Case – Commissioned Site’s Alarm History Maintenance-Select

Test Case ID		12		
Tested Component		Select Site Name		
Tested Area		Functionality		
Purpose		User can select Site Name and Its records are shown on input box for editing purpose.		
Prerequisites		Site Name stored as Not-commissioned Status=“False”		
Test Data				
Test Case Description				
No.	Test Case	Sample Data	Expected output	Results

1	Select "Maintain Commissioned Site's Alarm History"	–	"Commissioned Site's Alarm History Maintenance" GUI should be given	Pass
2	Select the Site Name from the list box	–	Search records of selected Site Name and display on relevant input box  Input Box: Site Name Input Box: Battery Bank Duration Input Box: History Reason	Pass

### G.11 Test Case – Commissioned Site's Alarm History Maintenance- Insert

Test Case ID	13			
Tested Component	Add Record			
Tested Area	Functionality			
Purpose	User can Add new Site Names			
Prerequisites	Site Name should not existing as Commissioned or Not-Commissioned records			
Test Data	Site Name = { valid, existing, empty }			
Test Case Description				
No.	Test Case	Sample Data	Expected output	Results
1	Input Site Name on Input box. Send "Add Record".	Site Name: Hantana, B. bank capacity: 24, History Reason: Microwave link failure due to mist.	If B. bank Duration is numeric Show added Records on list box. Give message as "Site Name added successfully"	Pass
			Else Give message as "Please Enter numeric value for the Duration"	Pass
2	Input existing Site Name on Input box. Send "Add Record".	Site Name: Hantana, B. bank capacity: 24, History Reason: Microwave link failure due to mist.	Show Message box "Site already exists in Not-Commissioned Table" Or "Site already exists in Commissioned Table". Give message as "Site Name addition Failed"	Pass
3	Add empty record. Send "Add Record".	Site Name: B. bank capacity: History Reason:	Error message "Sorry! Required fields cannot be empty" should be displayed.	Pass



### G.12 Test Case – Commissioned Site’s Alarm History Maintenance- Modify

Test Case ID	14			
Tested Component	Modify Record			
Tested Area	Functionality			
Purpose	User can Modify selected Site Name			
Prerequisites	Site Name stored as Not-commissioned Status=“False”			
Test Data	Site Name = { valid, existing, empty }			
Test Case Description				
No.	Test Case	Sample Data	Expected output	Results
1	Select the Site Name. Edit Site Name on Input box. Send “Modify Record”.	Site Name: Hantana, B. bank capacity: 16, History Reason: Microwave link failure due to E1 errors.	If B. bank Duration is numeric Show added Records on list box. Give message as "Site Name modified successfully"	Pass
			Else Give message as "Please Enter numeric value for the Duration"	Pass
2	Select the Site Name. Edit existing Site Name with same Battery bank capacity, History reason on Input boxes. Send “Modify Record”.	Site Name: Hantana, B. bank capacity: 16, History Reason: Microwave link failure due to E1 errors.	Show Message box "Site already exists in Not-Commissioned Table" Or “Site already exists in Commissioned Table”. Give message as "Site Name modification Failed"	Pass
3	Select the Site Name. Edit empty record. Send “Modify Record”.	Site Name: B. bank capacity: History Reason:	Error message "Sorry! Required fields cannot be empty" should be displayed.	Pass

### G.13 Test Case -Commissioned Site’s Alarm History Maintenance-Not-Commissioned

Test Case ID	14			
Tested Component	Modify Record			
Tested Area	Functionality			
Purpose	User can Modify Commissioned Sites as Not-Commissioned			
Prerequisites	Site Name stored as Not-commissioned Status=“False”			
Test Data	Site Name = { valid, existing, empty }			
Test Case Description				
No.	Test Case	Sample Data	Expected output	Results
1	Select the Site	Site Name:	Clear Record from list box.	Pass



	Name. Send "Commissioned".	Hantana	Give message as "Site added to Not-Commissioned"	
2	Edit existing Site Name with same Battery bank capacity, History reason on Input boxes. Send "Commissioned".	Site Name: Hantana	Show Message box "Site already exists in Not-Commissioned Table" Or "Site already exists in Commissioned Table". Give message as "Site Name modification Failed"	Pass
3	Edit empty record. Send "Commissioned".	Site Name:	Error message "Sorry! Required fields cannot be empty" display.	Pass

#### G.14 Test Case – Commissioned Site’s Alarm History Maintenance - Delete

Test Case ID	16			
Tested Component	Delete Record			
Tested Area	Functionality			
Purpose	User can Delete Commissioned Sites			
Prerequisites	Site Name stored as Not-commissioned Status="False"			
Test Data	Site Name = { valid, invalid, empty }			
Test Case Description				
No.	Test Case	Sample Data	Expected output	Results
1	Select the site Name. Send "Delete Record".	Site Name: Wattala_2	Message Box show "Are you Sure, You want to Delete" Send Yes. Clear Record from list box Give message as "Site 'Wattala_2' deleted successfully".	Pass
			Send No Give message as "Site Name deletion aborted".	Pass
2	Input not existing Site Name Send "Delete Record".	Site Name: Matara_2	Error message "Site 'Matara_2' not existing" should be displayed.	Pass
3	Input empty Site Name Send "Delete Record".	Site Name:	Error message "Sorry! Required fields cannot be empty" display	Pass

**G.15 Test Case – Search by Site Name /by Alarm Code - Search**

Test Case ID	17			
Tested Component	Search Records			
Tested Area	Functionality			
Purpose	User can search by Site Name or Alarm Code records			
Prerequisites	Site Name or Alarm Code should exist with records			
Test Data	Search = { Site Name, Alarm Code }			
Test Case Description				
No.	Test Case	Sample Data	Expected output	Results
1	Input existing Site Name. Send “Search”.	Search: Hantana	Alarm Grid display gives existing Site Name records.	Pass
2	Input existing Alarm Code. Send “Search”.	Search: 3861	Alarm Grid display gives existing Alarm Code records.	Pass
3	Input not existing record. Send “Search”.	Search:	Alarm Grid display is empty.	Pass

**G.16 Test Case – Search by Site Name /by Alarm Code - Print**

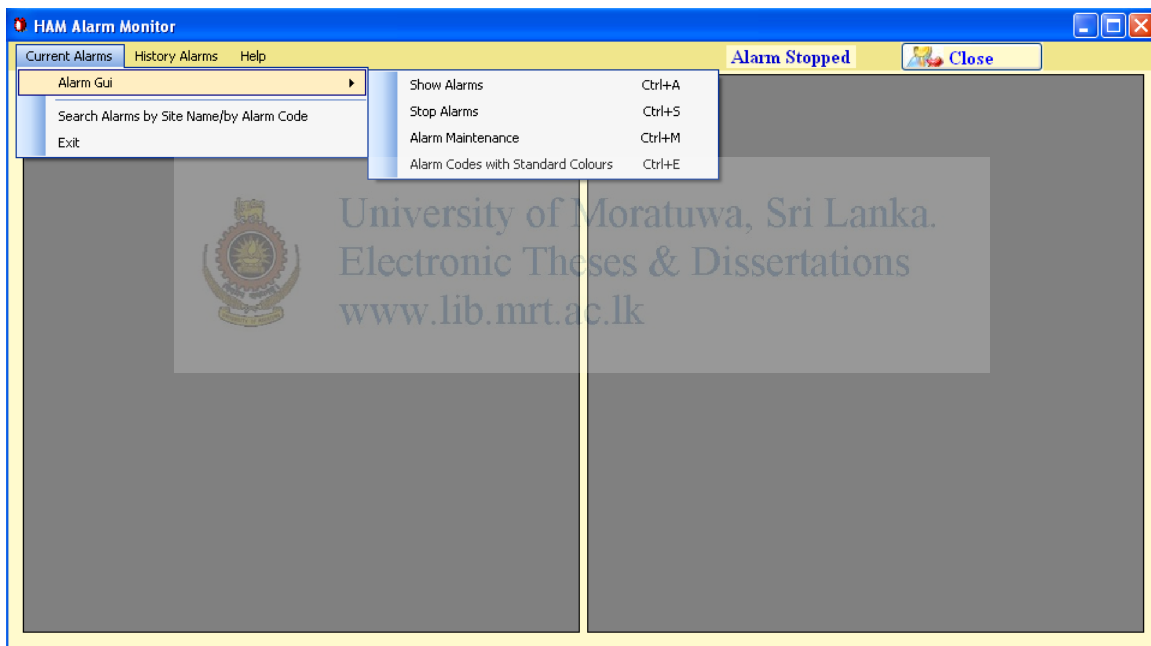
Test Case ID	18			
Tested Component	Print Record			
Tested Area	Functionality			
Purpose	User can print Site Name or Alarm Code records			
Prerequisites	Site Name or Alarm Code should exist with records			
Test Data				
No.	Test Case	Sample Data	Expected output	Results
1	Select “Print”. Send print button on print preview.	–	Alarm Grid display records show on print preview and then print.	Pass

## Appendix H

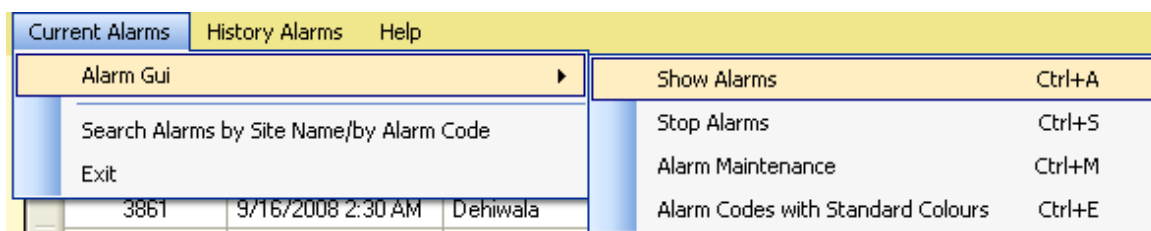
### User's Manual

#### Product Features:

- **HAM Alarm Monitor** for view current alarms
- **Alarm maintenance interface** for input and modify Alarm code colours
- **Standard Colours interface** for set standard colour settings
- **Search interface** for search and create reports with print option.
- **Commissioned site's Alarm History Maintenance interface** for input and modify alarm history details
- **Not-Commissioned site Maintenance interface** for input and modify not commissioned sites



#### H.0 Procedure:



- Select “Show Alarms” Ctrl+A from Current Alarms menu.

AlarmCode	Date_Time	SiteName	Detail	Location
3861	9/17/2008 9:20 AM	Kakutara	Temperature Alarm	15id45
3861	9/16/2008 8:09 AM	Mabole	Temperature Alarm	12_id45
3861	9/16/2008 2:30 AM	Dehiwala	Temperature Alarm	82_id45
3861	12/12/2007	Borella	Temperature Alarm	12_id45
3862	9/16/2008 10:00 AM	Dehiwala2	Power Alarm	45_id61
3862	11/11/2007	Borella	Power Alarm	45_id61
6814	9/18/2008 9:30 AM	MitLavinia	Fan Alarm2	16_id46
6814	9/18/2008 9:30 AM	Battaramulla	Fan Alarm2	16_id46
6817	9/18/2008 11:23 AM	Bambalapitiya	Fan Alarm	23_id8
6817	9/18/2008 9:30 AM	Grandpass	Fan Alarm	18_id46
6817	9/16/2008 5:43 AM	Malanbe	Fan Alarm	15_id61
6859	9/18/2008 8:30 AM	Gampaha	Cell Break	93_id8
6859	9/17/2008 7:53 AM	Rajagiriya	Fan Alarm	49_id61
8194	9/18/2008 11:30 AM	Borella2	Cell Break	21_id45
8194	9/18/2008 10:00 AM	Negombo	Cell Break	7_id45
8194	9/18/2008 8:40 AM	Moratuwa	Cell Break	23_id8
8194	9/18/2008	Fort	Cell Break	23_id8
8196	9/18/2008 3:55 AM	Fort Station	Cell Break	57_id45
8196	9/18/2008 4:25 AM	Maharagama	Cell Break	57_id45

AlarmCode	Date_Time	SiteName	Detail	Location
3861	9/16/2008 8:09 AM	Kaduruwela	Temperature Alarm	12_id45
3861	9/16/2008 2:30 AM	Kegalle	Temperature Alarm	82_id45
3862	8.Bank Duration -0hours, Failure case:suspect Power Failure and battery drain			
6814	9/18/2008 9:30 AM	Ginigathena	Fan Alarm	18_id46
6814	9/18/2008 9:30 AM	Kegalle	Fan Alarm2	16_id46
6814	9/18/2008 9:30 AM	Anuradhapura	Fan Alarm2	16_id46
6817	9/18/2008 11:23 AM	Gandara	Fan Alarm	23_id8
6817	9/17/2008 7:53 AM	Polonnaruwa	Fan Alarm	49_id61
6817	9/16/2008 5:43 AM	Trincomalee	Fan Alarm	15_id61
8194	9/18/2008 11:30 AM	Yatiyantota	Cell Break	21_id45
8194	9/18/2008 8:40 AM	Hikkaduwa	Cell Break	23_id8
8194	9/18/2008 8:30 AM	Devundara	Cell Break	93_id8
8194	9/18/2008	Aluthgama	Cell Break	23_id8
8196	9/18/2008 10:00 AM	Gandara	Cell Break	7_id45
8196	9/18/2008 4:25 AM	Ratnapura	Cell Break	57_id45
8196	9/17/2008 9:20 AM	Tangalle	Temperature Alarm	15id45

Current Alarms are shown on the Alarm monitor interface.

**Stop real-time monitoring:**

- Select “Stop Alarms” Ctrl+S from Current Alarms menu.

**H.1 System maintenance:**

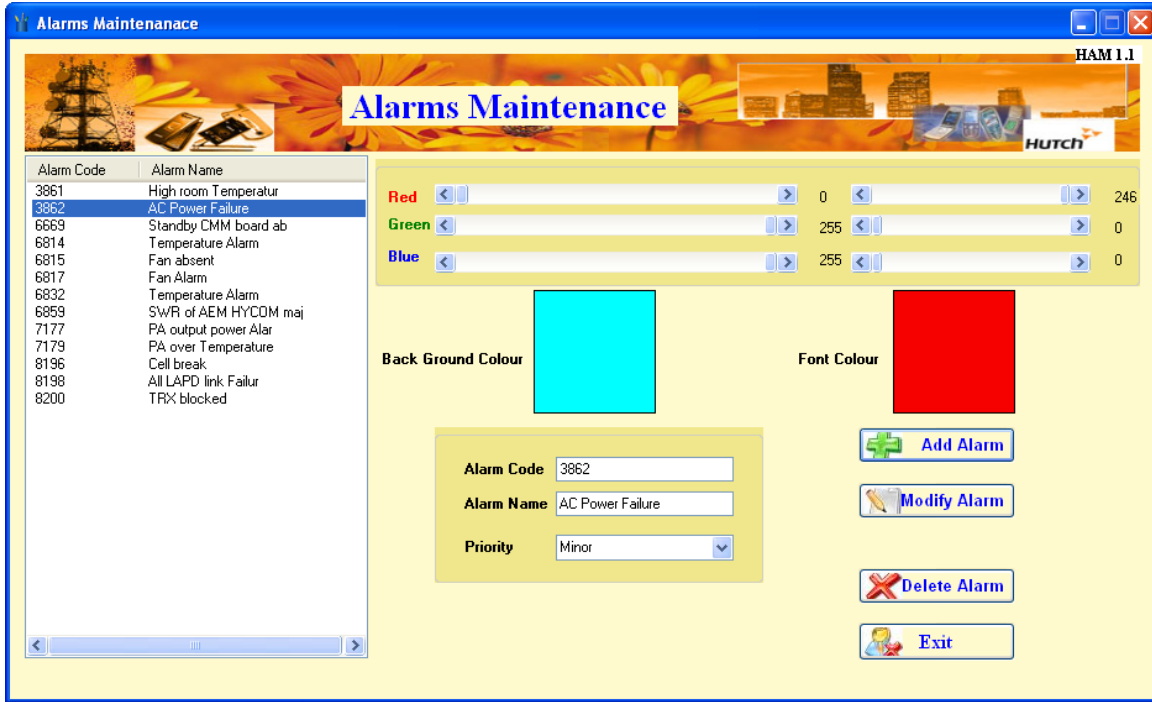
Current Alarms	History Alarms	Help
Alarm Gui		
Search Alarms by Site Name/by Alarm Code		
Exit		
	Show Alarms	Ctrl+A
	Stop Alarms	Ctrl+S
	Alarm Maintenance	Ctrl+M
	Alarm Codes with Standard Colours	Ctrl+E

- Select “Alarm Maintenance” Ctrl+M from Current Alarms menu.

**HAM 1.1** – “Alarm Maintenance” will show.

Add alarm code

- Add new alarm code on “Alarm Code” input box
- Add new alarm Name on “Alarm Name” input box
- Select Priority from “Priority” input box
- Select background and font colours from horizontal scroll bars for colour option
- Select “Add Alarm”



**Modify alarm code**

- Select alarm code from List box
- Modify alarm Name on “Alarm Name” input box
- Modify Priority from “Priority” input box
- Select background and font colours from horizontal scroll bars for colour option
- Select “Modify Alarm”

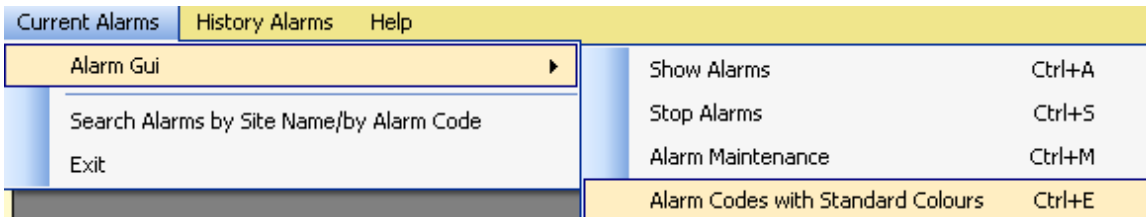
**Delete alarm code**

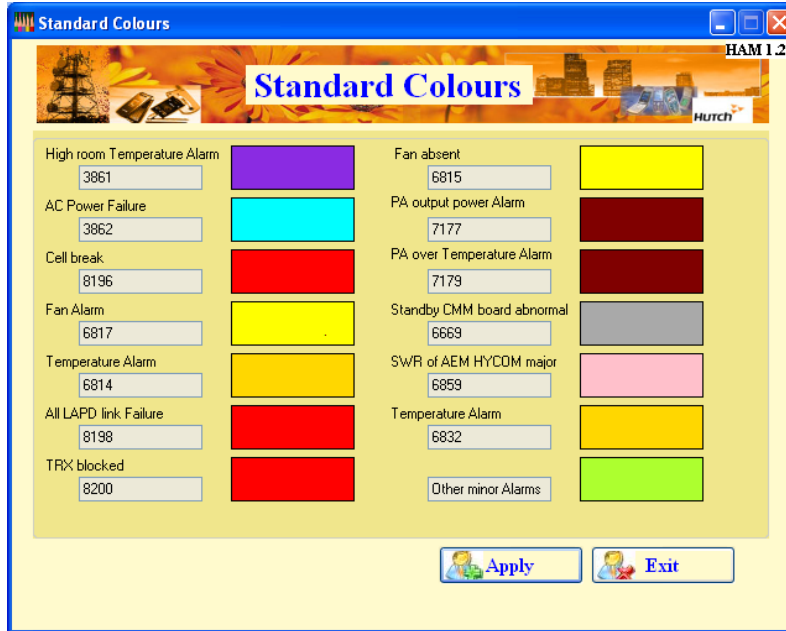
- Select alarm code from List box
- Select “Delete Alarm”

**H.2 Set standard colours:**

- Select “Alarm Codes with Standard Colours” Ctrl+E from Current Alarms menu.

**HAM 1.2 - “Alarm Codes with Standard Colours” will show**





HAM 1.2 – “Standard Colours” will show.

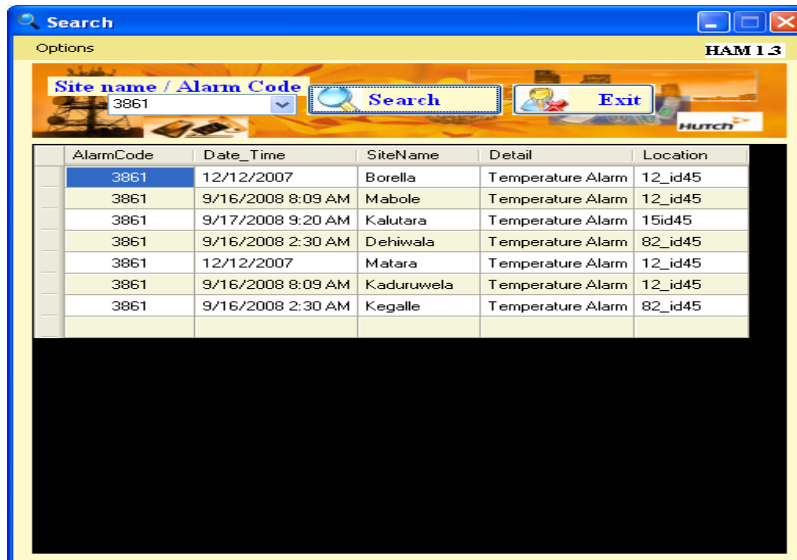
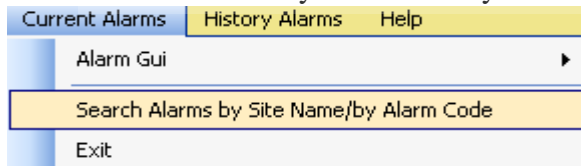
Apply

- Select “Apply” and then standard colours will appear on HAM Alarm monitor.

### H.3 Search and Reports Print:

Select “Search Alarms by Site Name/by Alarm Code” from Current Alarms menu

**HAM 1.3** - “Search Alarms by Site Name/by Alarm Code” will show

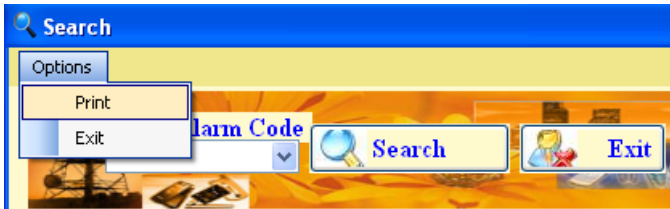


Search site name

- Select site name from List box
- Select “Search” and then selected alarms will display.

Create Report and Print

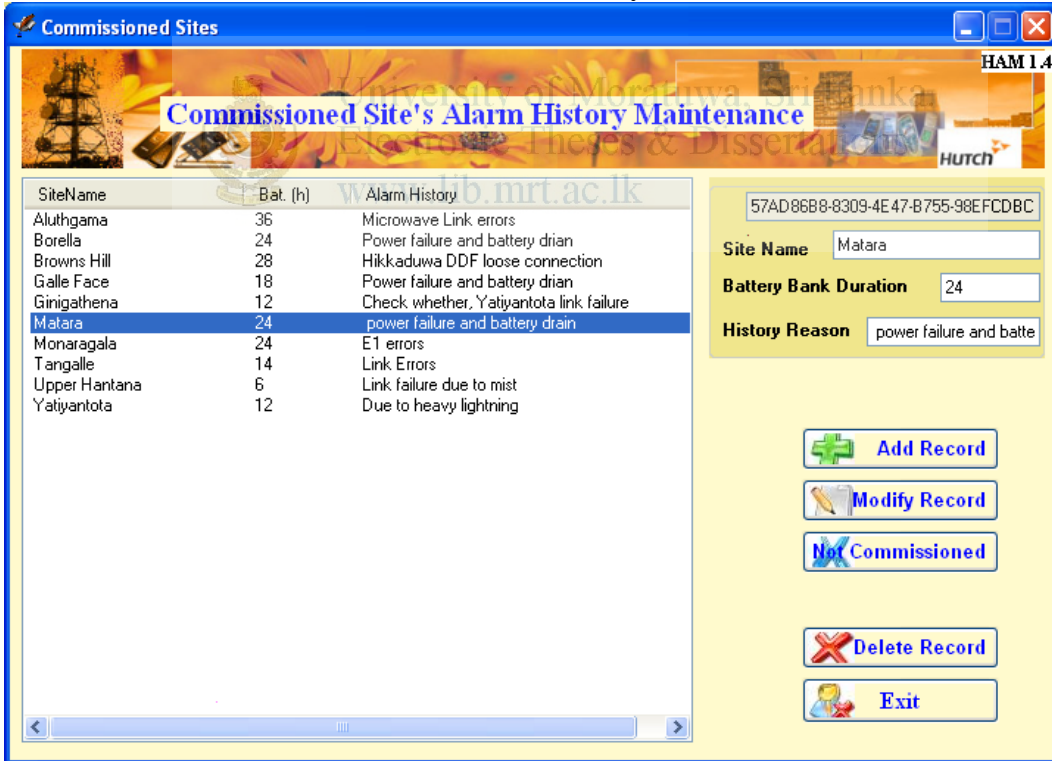
- Select “Print” from “Options”
- Report will display
- Select printer to print



**H.4 Commissioned Site's Alarm History Maintenance:**

Select “Commissioned Site's Alarm History Maintenance” from Current Alarms menu

**HAM 1.4 - “Commissioned Site's Alarm History Maintenance” will show**



Add site name

- Add new site name on “Site Name” input box
- Add battery bank duration on “Battery Bank Duration” input box
- Add history reason on “History Reason” input box
- Select “Add Record”



#### Modify site name

- Select site name from List box
- Modify site name on “Site Name” input box
- Modify battery bank duration on “Battery Bank Duration” input box
- Modify history reason on “History Reason” input box
- Select “Modify Record”

#### Delete site name

- Select site name from List box
- Select “Delete Record”

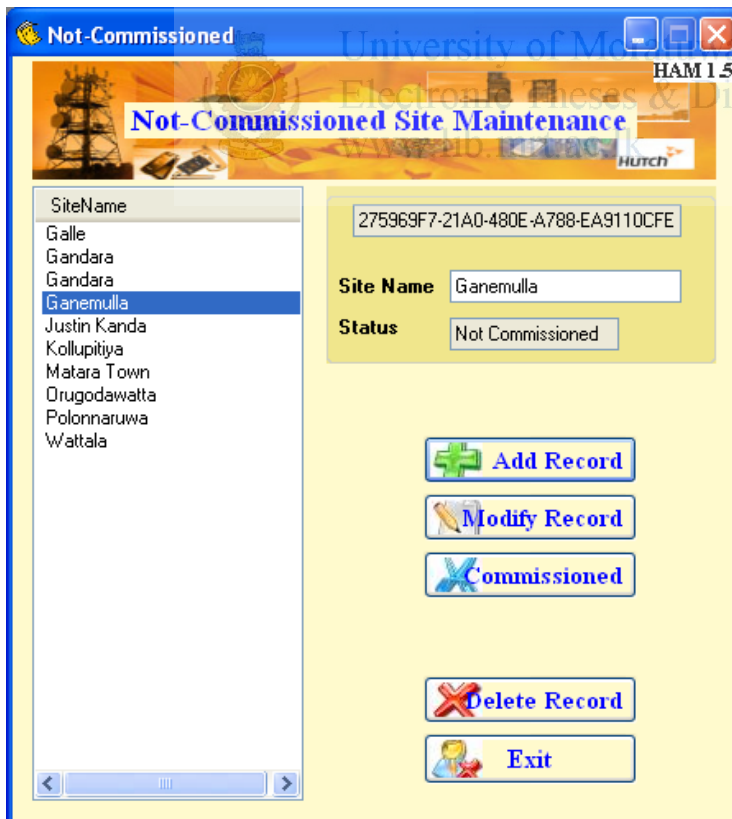
#### Change status to not - commissioned

- Select alarm code from List box
- Select “Not Commissioned” site record will hide from GUI interface and it moves to “Not Commissioned”

### H.5 Not Commissioned Site Maintenance:

Select “Not Commissioned Site Maintenance” from Current Alarms menu

**HAM 1.5** - “Not Commissioned Site Maintenance” will show





Add site name

- Add new site name on “Site Name” input box
- Select “Add Record”

Modify site name

- Select site name from List box
- Modify site name on “Site Name” input box
- Select “Modify Record”

Delete site name

- Select site name from List box
- Select “Delete Record”

Change status to “commissioned”

- Select alarm code from List box
- Select “Commissioned” site record will hide from GUI interface and it moves to “Commissioned”

