Detailed Design Specification

for the

HAZUS-MH® Hurricane Model

April 28, 2009

(Revision 1.0)

Project No. 812

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0.1	10/23/00	Document outline.
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0.3	01/18/02	Second draft. Major changes and additions to Section 3.1 and Section 4 to reflect: (a) the selection of ArcView 8.1 as the GIS platform, (b) updates to the HAZUS common data model, and (c) updates to the Hurricane Preview Model SRS.
1.0	4/28/09	Updated for MR4

Contents

1. Introduction

1.1 Purpose

The purpose of this Detailed Design Specification (DDS) is to document design information needed for planning, analysis, and implementation of the HAZUS-MH Hurricane Model (HM). The intent is to partition the system into design entities and describe the important properties and relationships among those entities.

This document is a blueprint from which the Hurricane Model will be implemented and, as such, shall be a dynamic document to allow updating of the design throughout the life cycle process.

1.2 Background

The overall objective of the HAZUS project is to develop nationally applicable standardized multi-hazard methodologies for estimating potential wind, flood, and earthquake losses on a regional basis. The multi-hazard HAZUS is intended to be used by local, state, and regional officials for planning and stimulating mitigation efforts to reduce losses from hurricanes, severe floods, and earthquakes and preparing for emergency response and recovery following these events. Depending on the capability built in for each hazard, the multi-hazard HAZUS may also be used to prepare a real time (rapid loss) estimate following an event.

HAZUS-MH is capable of integrated multi-hazard loss estimation and has the following major features:

- A Partial Hurricane Model, a completed Flood Model, and a completed Earthquake Model
- Capability to run both deterministic and probabilistic scenarios
- A single, integrated set of functions for study region creation for all three models
- Geographic Information System (GIS) functions
- Capability to receive user-supplied input for all three models to generate more refined loss estimations
- Varying degrees of real-time analysis for each hazard
- State-of-the-Art software, fully documented with metadata for all databases

1.3 Scope

This document is intended to show how the HM will be structured to satisfy the requirements identified in the HM SRS. This document describes the design of the HM, including all interfaces with other HAZUS modules. This document does not describe the designs of the other hazard-specific modules (i.e., Earthquake and Flood).

1.4 Definitions, Acronyms, and Abbreviations

1.4.1 Definitions

The following definitions are taken from Section 3 of the IEEE Standard 1016-1998:

- Design Entity– An element or component of a design that is structurally and functionally distinct from other elements and that is separately named and referenced.
- Design View – A subset of the design entity attribute that is specifically suited to the needs of a software project activity.
- Entity Attribute– A named characteristic or property of a design entity. It provides a statement of fact about the entity.
- Software Design Description (SDD) – A representation of a software system created to facilitate analysis, planning, implementation, and decision-making. A blueprint or model of the software system. The SDD is used as the primary medium for communication software design information.

Figure 1 summarizes the object modeling notation used in Section 3. The symbols are based on the UML notation used by Ritcher (1999).

The following object modeling terms are also used in Section 3:

- Classes and Objects
  - Coclass – A coclass represents COM objects that can be directly created using the object declaration syntax in a development environment. In Visual C++, this is written with the FooObject pFoo or FooObject *pFoo = new FooObject syntax.

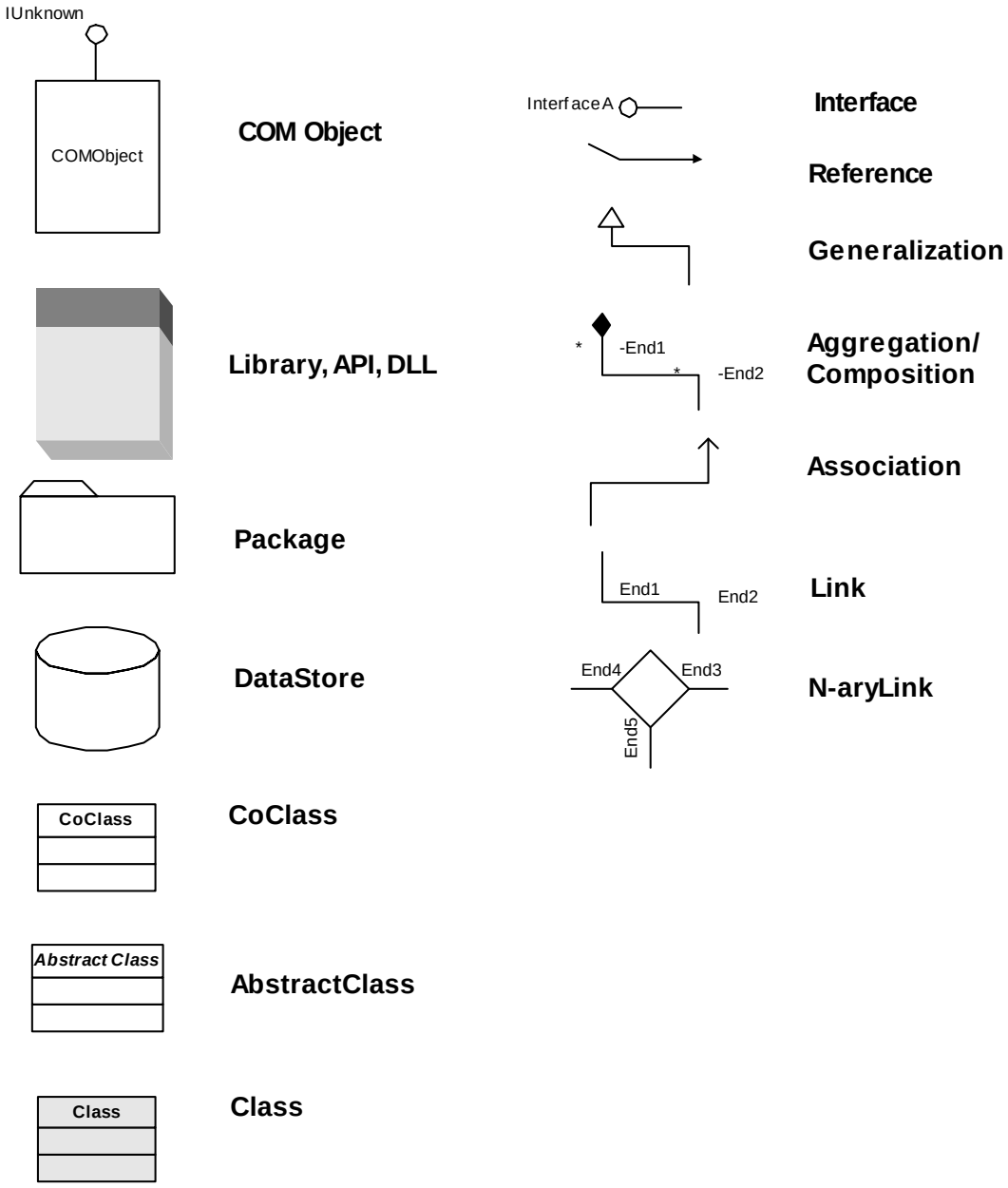

Figure 1. HM Object Model Notation

- Abstract Class – An abstract class cannot be used to create new objects. It is a specification for subclasses.

- Relationships

  - Associations – Associations represent relationships between classes. They have defined multiplicities at both ends.

- N-ary Association – N-ary association specifies that more than two classes are associated. A diamond is placed at the intersection of the association branches.

- Multiplicity – A Multiplicity is a constraint on the number of objects that can be associated with another object. Association and composition relationships have multiplicities on both sides. The notation for multiplicities is:

  1 – One and only one (if none is shown, one is implied)

  0..1 – Zero or one

  M..N – From M to N (positive integers)

  * or 0..* – From zero to any positive integer

  1..* – From one to any positive integer

- Composition – Composition is a stronger form of aggregation in which objects from the "whole" class control the lifetime of objects from the "part" class.

- Type Inheritance – Type inheritance defines specialized classes that share properties and methods with the superclass and have additional properties and methods.

- Instantiation – Instantiation specifies that one object from one class has a member with which it creates an object from another class.

1.4.2 Acronyms and Abbreviations

See Appendix A for a listing of acronyms and abbreviations used in this document.

1.5 Document Overview

This document generally follows the example provided in Table 4 (Section 7.4) of the IEEE Guide to Software Design Descriptions. After providing a list of references in Section 2, the remainder of the document is divided into two main sections: Architectural Design (Section 3) and Detailed Design (Section 4). The principal design entities described in Sections 3 and 4 are the Data layer, Application layer, and Presentation layer.

The Data layer includes the conceptual and physical data models for the HM database and the Data Services package, which will be used to access data from the underlying RDBMS using the ActiveX Data Objects (ADO). The Application layer implements the business logic components. This layer includes the Analysis Engine and will also provide a layer of abstraction between the user interface and underlying database. Finally, the Presentation layer implements the Graphical User Interface (GUI).

The document concludes with two appendices. A listing of acronyms and abbreviations used in this document is in Appendix A, and the HM Data Dictionary is in Appendix B.

2. References

Applied Research Associates, Draft Product Requirements Document for the HAZUS Hurricane Preview Model (Revision 0.3), ARA 4778, May 2001.

Applied Research Associates, Draft Software Requirements Specification for the HAZUS Hurricane Preview Model (Revision 0.3), ARA 4778, October 2001.

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Vickery, P. J., Skerlj, P. F., Steckley, A. C., and Twisdale, L. A., “Hurricane Wind Field Model for Use in Hurricane Simulations,: Journal of Structural Engineering, Vol. 126, No. 10, pp. 1203-1221.

3. Architectural Design

3.1 Decomposition Design Description

This section describes the partitioning of the Hurricane Model (HM) software system into its three major design entities: Data layer (Section 3.1.1), Application layer (Section 3.1.2), and Presentation layer (Section 3.1.3). The HM architecture can be further decomposed into the database and the five software design packages listed in Table 1.

Table 1. Software Design Packages

Package Name	Description
HU_DATASERVICE_PKG	Data Access Layer
HU_CALCULATIONENGINE_PKG	Application Layer
HU_WORKFLOW_PKG	Application Layer
HU_USERINTERFACE_PKG	Presentation Layer
HU_REPORTENGINE_PKG	Presentation Layer

Figure 2 shows the relationships between the software packages, the database, and the third party libraries used by the HM. The notation used in the HM Object Model Design is summarized in Section 1.4.1. The arrows in Figure 2 indicate dependency relationships between the packages. Each dependency is directed toward the layer (or package) being accessed. It indicates that one or more entities in the source package must access entities in the destination package. For example, the HU_WORKFLOW_PKG component accesses the underlying data through the services provided by the HU_DATASERVICES_PKG.

The HM software system is built using Microsoft's Component Object Model (COM). Each software package in the HM consists of one or more COM objects. Developing with COM demands well-defined interfaces. All communication between objects is made via their interfaces. COM interfaces are abstract, meaning there is no implementation associated with an interface. The code associated with an interface comes from a coclass implementation. Put succinctly, the interface of a COM object defines what the object can do and the coclass defines how it is done.

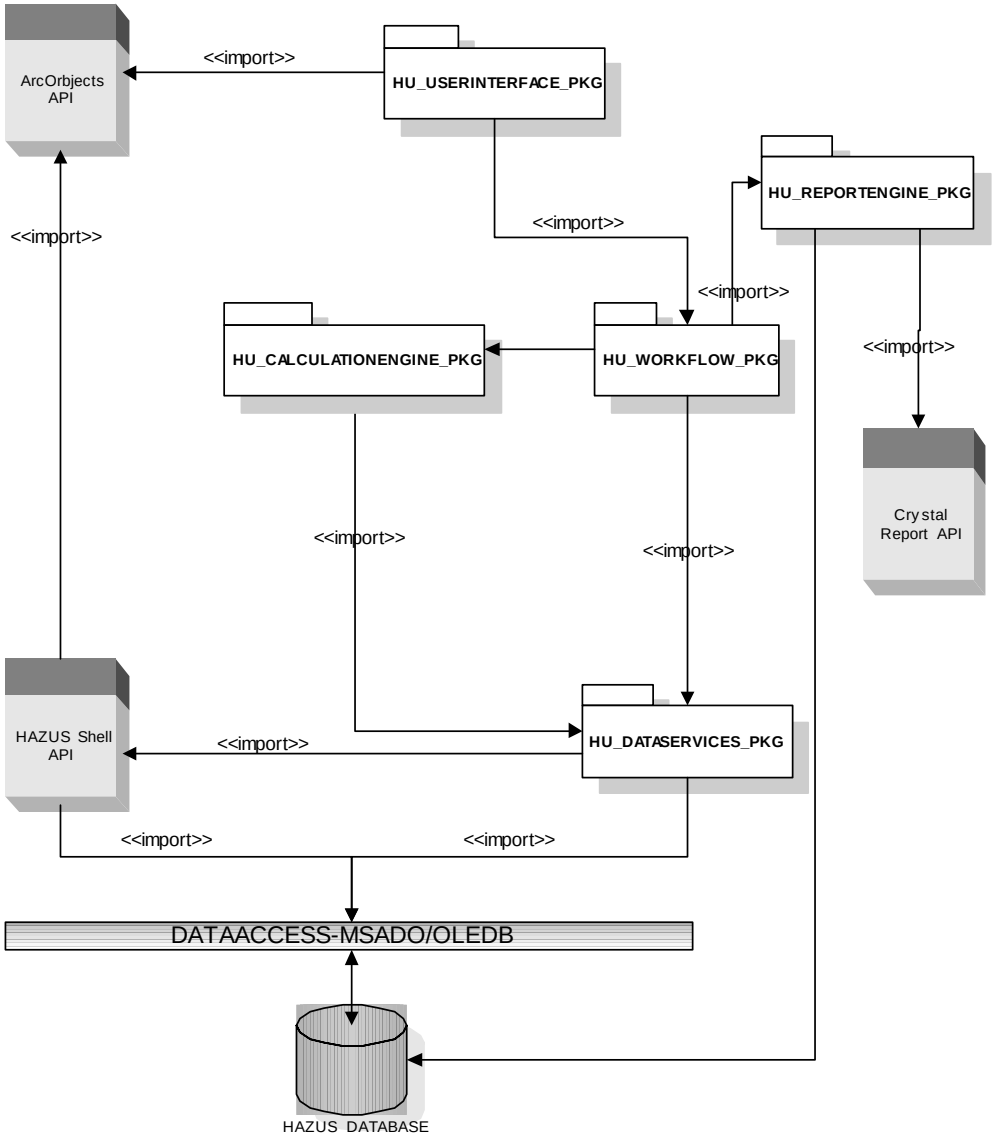

Figure 2. High-Level Architecture Diagram for the Hurricane Model

3.1.1 Data Layer Design

This section describes the Hurricane Model Data layer, which includes the database and the Data Services package. The database design description is sub-divided into the conceptual data model (Section 3.1.1.1), the physical data model (Section 3.1.1.2), and the data dictionary (Section 3.1.1.3). The Data layer design description concludes with a description of the Data Services package (3.1.1.4).

Due to the MSDE size limitations, the database has been split into two parts: System and Template. The system database contains data that are common to all study regions (e.g., user interface parameter data) as well as bookkeeping data for managing individual study regions and scenarios. Each template database contains data specific to a single study region. When the user creates a new study region, HAZUS executes a SQL script, which creates a copy of the template tables and populates these tables with information specific to the study region.

3.1.1.1 Conceptual Data Model

This section describes the Conceptual Data Model (CDM) for the Hurricane Model portion of the HAZUS-MH database. The Entity-Relationship Diagrams (ERDs) in this section provide a conceptual view of the Hurricane Model. Entities common to all hazards are denoted by an “hz” prefix. Entities specific to hurricane hazards are denoted by a “hu” prefix. System entities/tables, which are hurricane-specific, are denoted by the suffix “Hu”. Entities that share common attributes are associated through inheritance.

3.1.1.1.1 System Data Model

As mentioned earlier, the system data model contains the tables used globally by HAZUS. These tables are used to store Hazard Scenarios, Building Stock Classifications, Damage and Loss Functions, and Support Data.

3.1.1.1.1.1 General Study Region Data

The user begins an analysis by creating a study region. The data describing each study region, such as date created and applicable hazards are stored in the syStudyRegion table.

3.1.1.1.1.2 Hazard Scenario Data

Hazard scenarios are not restricted to a single study region. Any study region has access to information about each scenario, such as scenario type, scenario name, and creation date. The three general types of scenario available through the hurricane model are the probabilistic scenario, a historic storm scenario, or a user-defined/deterministic storm scenario. Which scenario is current is controlled using a registry entry and by a bSSCurrent flag inherited by each of the scenario entities (Figure 3). The user can create a new storm scenario or use an

existing storm scenario in any study region. The entities shown in Figure 4 store the deterministic scenarios, and Figure 5 shows the historic storm scenario entities. There are no entities for probabilistic scenario because the data for this type of scenario are not stored in the database but in binary files. This is discussed later in the Calculation Engine Package.

The user-defined/deterministic storm scenario data are stored in the huScenario table shown in Figure 3. Deterministic storm scenarios are analyzed by storm track. The storm track attributes such as translation speed, radius to max winds is stored in the huStormTrack table.

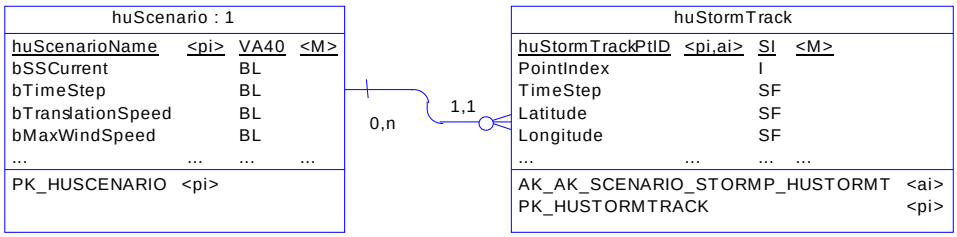

Figure 3. System Level – Hazard Scenario Tables

The analysis engine requires the wind speeds in each census tract. The Wind Field model calculates these wind speeds for deterministic scenarios and stores the results in the huDeterminWindSpeedResults and the huDeterminWindSpeedResultsByTimeStep tables. The huDeterminWindSpeedResults entity and relationships for a deterministic storm scenario are shown in Figure 4. The peak gust and 1-minute sustained wind speed results for the deterministic scenarios are stored in the huDetermWindSpeedResults table by census tract and huScenarioName.

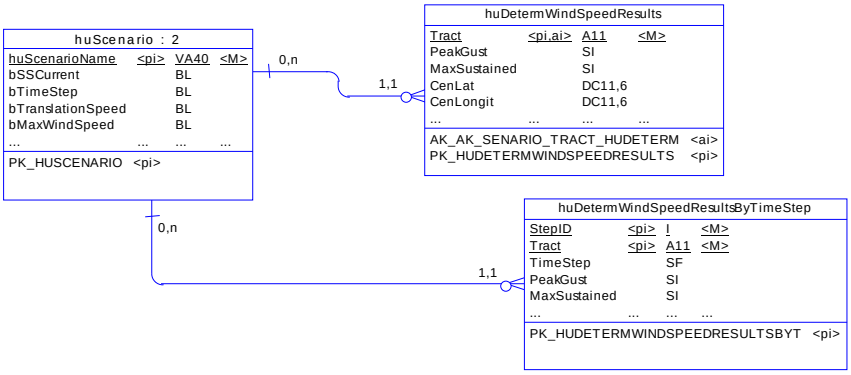

Figure 4. Hurricane Deterministic Wind Speed Results Table

Like the deterministic storm scenario, the historic storm scenarios, shown in Figure 5, are stored in the system database. The huHistoricStormList entity contains a list of all the historic storms up to and including the year 2005. The wind speeds for each of these storms are stored in the huHistoricWindSpeedResults entities. Both the storm list and the wind speeds are populated during the installation of HAZUS-MH and are not editable.

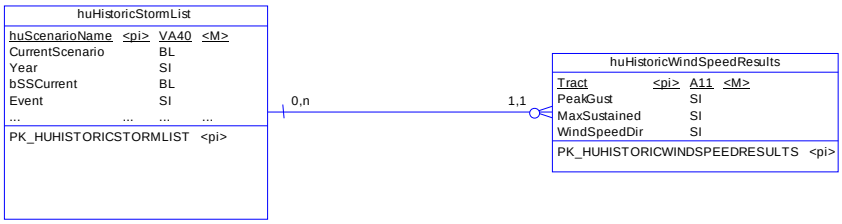

Figure 5. Hurricane Historic Wind Speed Results Table

3.1.1.1.1.3 General Building Stock Data

The hurricane building type entity relationships are shown in Figure 6. The table clBldgTypeHu, and the table huListOfWIndBuildingTypes hold descriptions of the Specific Building Types (SBT), and Wind Building Types (WBT), respectively.

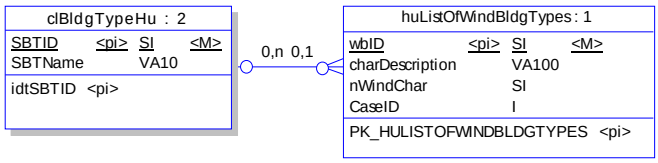

Figure 6. General Building Stock Classification Tables

The wind building types are a combination of a specific building type and wind building characteristics valid for that specific building type. For example, a wood frame, one-story, single-family dwelling could have a hip roof shape, no secondary water resistance, roof deck attachment using 8d nails, hurricane straps, no garage, and no shutters. The description in the huListOfWindBuildingTypes entity would be “rshipswrnorda8dtnailgdnodshtno”.

The specific building types stored in the clBlgTypeHu table are summarized in Table 2. The wind building characteristics are discussed in Section 3.1.1.1.2.2.

Table 2. Specific Building Types

Specific Building Type	Definition	Methodology Report Section
WSF1	Wood, Single Family, One Story	6.4
WSF2	Wood, Single Family, Two or More Stories	6.4
WMUH1	Wood, Multi-Unit Housing, One Story	6.9
WMUH2	Wood, Multi-Unit Housing, Two Stories	6.9
WMUH3	Wood, Multi-Unit Housing, Three or More Stories	6.9
MSF1	Masonry, Single Family, One Story	6.4
MSF2	Masonry, Single Family, Two or More Stories	6.4
MMUH1	Masonry, Multi-Unit Housing, One Story	6.9
MMUH2	Masonry, Multi-Unit Housing, Two Stories	6.9
MMUH3	Masonry, Multi-Unit Housing, Three or More Stories	6.9
MLRM1	Masonry, Low-Rise Strip Mall, Up to 15 Feet	6.10
MLRM2	Masonry, Low-Rise Strip Mall, More than 15 Feet	6.10
MLRI	Masonry, Low-Rise Industrial/Warehouse/Factory Buildings	6.13
MERBL	Masonry, Engineered Residential Building, Low-Rise (1-2 Stories)	6.12
MERBM	Masonry, Engineered Residential Building, Mid-Rise (3-5 Stories)	6.12
MERBH	Masonry, Engineered Residential Building, High-Rise (6+ Stories)	6.12
MECBL	Masonry, Engineered Commercial Building, Low-Rise (1-2 Stories)	6.12
MECBM	Masonry, Engineered Commercial Building, Mid-Rise (3-5 Stories)	6.12
MECBH	Masonry, Engineered Commercial Building, High-Rise (6+ Stories)	6.12
CERBL	Concrete, Engineered Residential Building, Low-Rise (1-2 Stories)	6.12
CERBM	Concrete, Engineered Residential Building, Mid-Rise (3-5 Stories)	6.12
CERBH	Concrete, Engineered Residential Building, High-Rise (6+ Stories)	6.12
CECBL	Concrete, Engineered Commercial Building, Low-Rise (1-2 Stories)	6.12
CECBM	Concrete, Engineered Commercial Building, Mid-Rise (3-5 Stories)	6.12
CECBH	Concrete, Engineered Commercial Building, High-Rise (6+ Stories)	6.12
SPMBS	Steel, Pre-Engineered Metal Building, Small	6.11
SPMBM	Steel, Pre-Engineered Metal Building, Medium	6.11
SPMBL	Steel, Pre-Engineered Metal Building, Large	6.11
SERBL	Steel, Engineered Residential Building, Low-Rise (1-2 Stories)	6.12
SERBM	Steel, Engineered Residential Building, Mid-Rise (3-5 Stories)	6.12
SERBH	Steel, Engineered Residential Building, High-Rise (6+ Stories)	6.12
SECBL	Steel, Engineered Commercial Building, Low-Rise (1-2 Stories)	6.12
SECBM	Steel, Engineered Commercial Building, Mid-Rise (3-5 Stories)	6.12
SECBH	Steel, Engineered Commercial Building, High-Rise (6+ Stories)	6.12
MHPHUD	Manufactured Home, Pre-HUD	6.5
MHHUDI	Manufactured Home, HUD I	6.5
MHHUDII	Manufactured Home, HUD II	6.5

Specific Building Type	Definition	Methodology Report Section
MHHUDIII	Manufactured Home, HUD III	6.5

3.1.1.1.1.4 Damage and Loss Function Tables

Each wind building type has several associated hurricane damage and loss functions, as shown in Figure 7. The huDamLossFunHu entity stores the damage and loss functions indexed by a damage/loss classification, surface roughness and wind building type. Each damage and loss function is defined for each wind building type by values assigned at 41 peak gust wind speeds ranging from 50 mph to 250 mph in 5 mph steps.

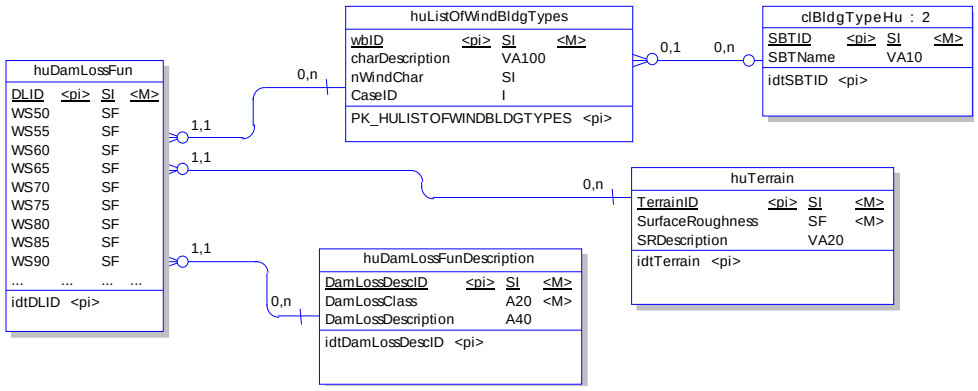

Figure 7. Hurricane Damage and Loss Function Tables

The huTerrain entity stores five standard surface roughness values. The surface roughness stored in this table is listed in Table 3.

Table 3. Terrain Values and Description

Terrain ID	Surface Roughness	Description
1	0.03	Open Terrain
2	0.15	Light Suburban
3	0.35	Suburban
4	0.70	Light Trees
5	1.00	Trees

The huDamLossFunDescription table stores the damage, loss, and debris classifications. The data stored in this table is summarized in Table 4.

Table 4. Damage and Loss Function Descriptions

Damage and Loss Function ID	Damage and Loss Classification	Description
1	Sight	Slight Damage
2	Moderate	Moderate Damage
3	Severe	Severe Damage
4	Total	Total Damage
5	Building	Building Loss
6	Content	Content Loss
7	LossOfUse	Loss of Use (days)
8	BrickWood	Brick/Wood Debris (lbs/sq.ft.)
9	ConcreteSteel	Concrete/Steel Debris (lbs/sq.ft.)

One of the analysis options in the hurricane model is tree blowdown. The tree blowdown functions are stored in the entities shown in Figure 8. Like the damage and loss functions, the tree blowdown functions are by specific building type and by the 41 wind speeds ranging from 50 to 250 in 5 mph increments.

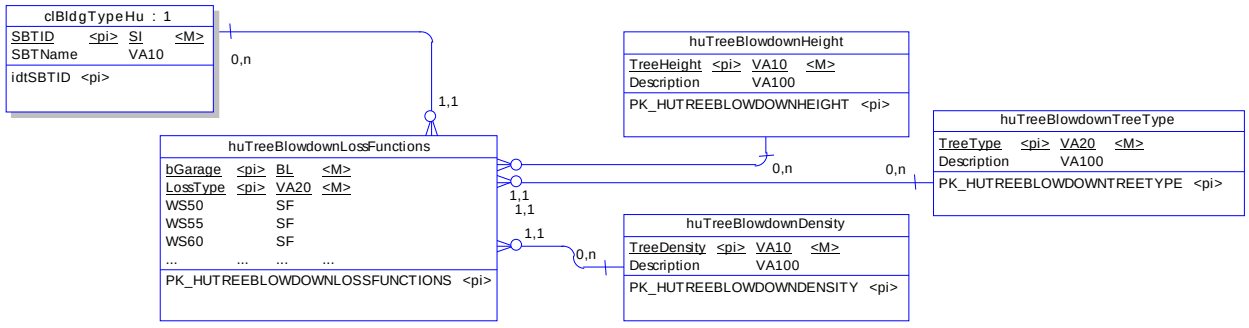

Figure 8. Hurricane Tree Blowdown Function Tables

3.1.1.1.1.5 Hurricane-Specific Support Tables

The grid properties tables and the output options tables are support table in the system database model used by the user interface in the Hurricane Model. The grid properties table store cell properties, such as column names, data type, and color, used by the grids in the data browsers. This table is shown in Figure 9.

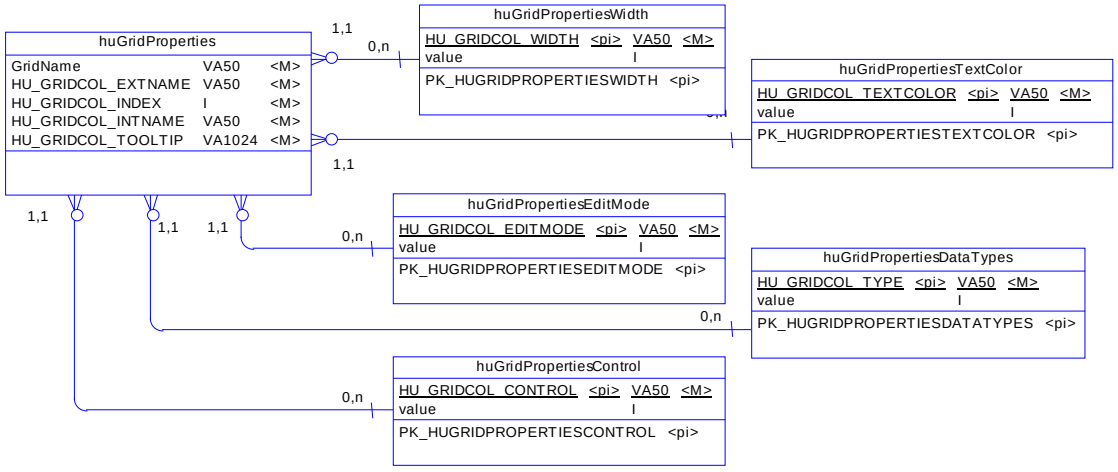

Figure 9. User Interface Grid Property Tables

The analysis output options are list of maps and list of summary reports that can be automatically created after an analysis is complete. These lists are stored in the tables in Figure 10.

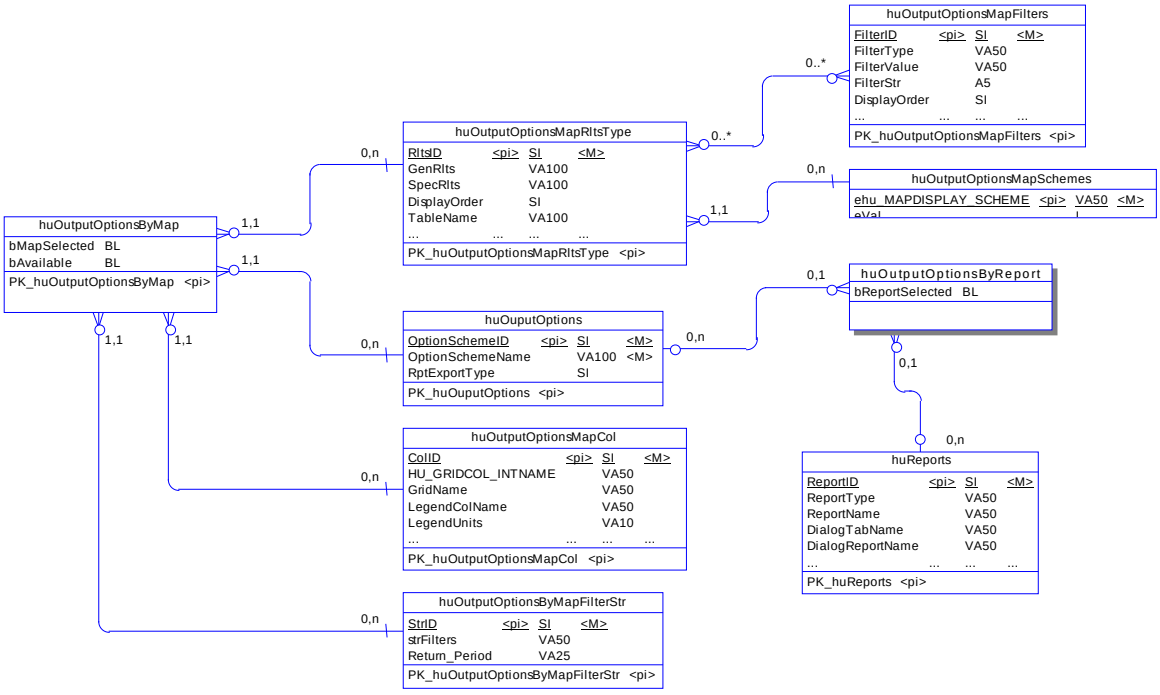

Figure 10. Analysis Output Map and Report OptionsTables

3.1.1.1.2 Template Database Model

When the user creates a new study region, HAZUS executes a SQL script that creates the template tables and populates them with data specific into the new study region database.

The Template CDM is divided into the following components:

- Inventory
  - General Building Stock
  - Essential Facilities
  - User-Defined Facilities
  - High Potential Loss Facilities
  - Lifeline Facilities, Segments, and Bridges
  - Pipelines
- Analysis Parameters
- Hurricane Results

Note that only General Building Stock, Essential Facilities, and User-Defined Facilities inventory items are currently explicitly modeled in the HM. The other facilities will only be available for mapping. A summary of map display and analysis options for each inventory item is provided in Table 5.

Table 5. Inventory Items

Inventory Item	Map Display	Analysis Options				
		Damage States	Economic Loss	Loss of Function	Debris	Shelter
General Building Stock (GBS)	☑	☑	☑		☑	☑
Essential Facilities (EF)	☑	☑		☑		
User-Defined Facilities (UDF)	☑	☑				
All Others (Utilities, HPLF, etc.)	☑					

The following sub-sections describe the Template Database CDM. Entities specific to the Hurricane Model are denoted with a “hu” prefix. Entities common to all three hazards are denoted with an “hz” prefix.

3.1.1.1.2.1 Geographical Data

Geographical data are stored in the hzTract table. A huTract entity has been added to the model to store census tract information specific to the Hurricane Model. There is a one to one relationship between huTract and hzTract. For each census tract there should be a corresponding entry in huTract. These tables are shown in Figure 11.

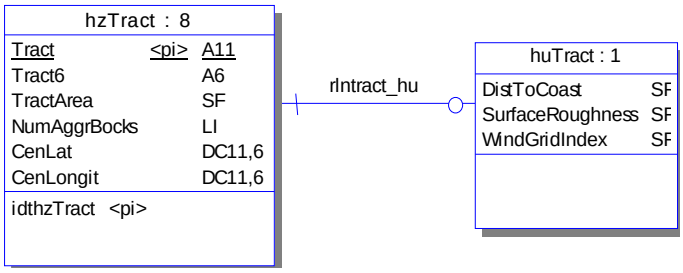

Figure 11. Hurricane-Specific Census Tract Data Table

3.1.1.1.2.2 General Building Stock Data

Figure 12 shows the ERD for the General Building Stock (GBS) count and exposure tables aggregated by building type. These tables store the GBS count and exposure data by General Building Type (GBT) and Specific Building Type (SBT) for each census tract (or census block) in the study region. If the study region does not include flood hazard, the data will be stored at the census tract level only.

The GBS count and exposure data aggregated by Specific Occupancy are also stored in the tables shown in Figure 12. These tables are not hurricane-specific and are accessible by all hazards. Again, if the study region does not include flood hazards, the data are stored at the census tract level only.

The distribution of GBT and SBT within each specific occupancy class must be specified for each census tract (or census block). The GBT and SBT occupancy mapping schemes are

stored in the database tables shown in Figure 13. Note that the GBT mapping schemes are common to all hazards. Individual GBT mapping schemes are defined in the hzBldgScheme table. The GBT mapping schemes specify the relative distributions of wood, masonry, steel, concrete, and manufactured buildings for each specific occupancy. For example, the specific occupancy RES1 might be comprised of 20% wood and 80% masonry structures in a given GBT mapping scheme. GBT mapping schemes are collected in the hzBldgSchemes table where they are referenced by individual census tracts (or census blocks).

SBT mapping schemes are stored in the huGbsOccMapping table. The SBT schemes specify the relative distribution of specific building types within a given specific occupancy and general building type. For example, in a particular SBT mapping scheme, the distribution of wood multi-family dwellings (RES3-Wood) might be 10% one-story (WMUH1), 60% two-story (WMUH2) and 30% three or more stories (WMUH3). The SBT mapping schemes are collected in the huGbsOccMappingList table where they are referenced by individual census tracts (or census blocks).

The wind building mapping tables are used to map the hurricane-specific building types to the wind building characteristics. The mapping is supported by the tables shown in Figure 14.

A wind building scheme from the hurricane building mapping list table (huBldgMappingList) must be assigned to each census tract (or census block). The mapping list table lists all the building mapping schemes available to the user. Initially this list will contain default building schemes. The user is able to create a new scheme by copying one of the default building schemes, renaming the scheme and then editing the scheme.

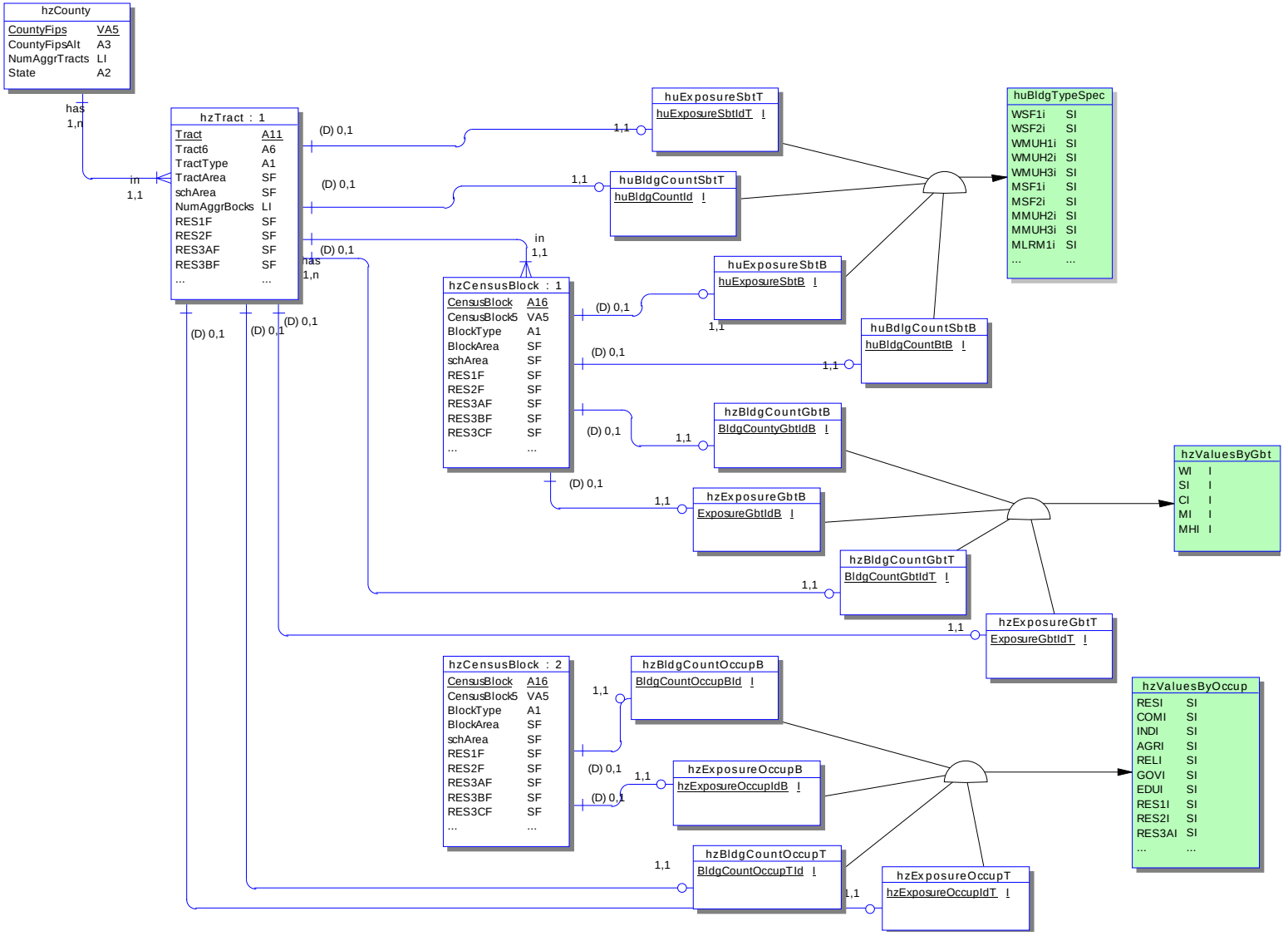

Figure 12. General Building Stock Exposure and Count Tables

The clBuildingTypehu table stores the name and description for each hurricane-specific building type. Each specific building type is referenced by a list of valid wind building characteristics for that specific building type, a building mapping scheme, and a list of wind building types.

The huBldgCharValidity table is used to relate the building wind characteristics with the specific building type. It is indexed by the huListOfBldgChar table and the clBuildingTypehu table. A list of wind building characteristics can be found in Table 6. Table 7 summarizes the valid characteristics for each specific building type. Note that some characteristics are conditional on the values of other characteristics. Figure 15 illustrates this concept for the specific case of wood frame, multi-unit houses.

The huBldgMapping table stores the percent distribution for each wind building characteristic for each specific building type. For example, the validity table entry for WSF1 is True for RoofShape. The categories for RoofShape are Hip and Gable. Suppose that the distribution for WSF1 is 50% Hip and 50% Gable. This distribution would be stored in the huBldgMapping by the Building Mapping List ID, the Specific Building Type ID, and the Building Characteristic ID from the huListOfBldgChar table. The Building Mapping List ID is then referenced to the huBldgMappingList table where the building mapping scheme is stored as a single name.

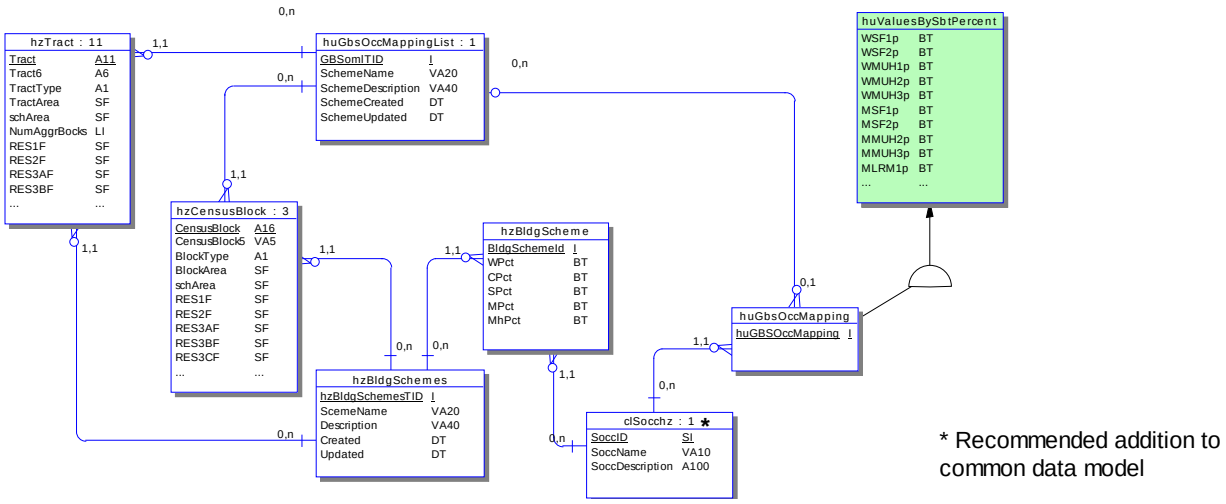

Figure 13. General Building Stock GBT and SBT Occupancy Mapping Tables

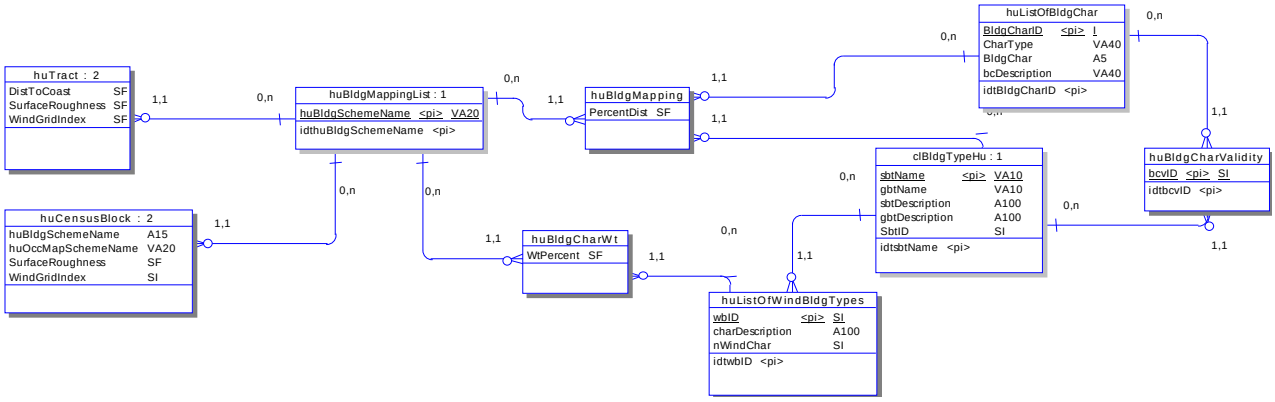

Figure 14. Wind Building Characteristics and Mapping Scheme Tables

Other tables related to the building mapping include the huListOfWindBldgTypes table and the huBldgCharWt table. The huListOfWindBldgTypes is used to store the list of wind build types. This table is identical to the huWindBldgChar table found in the System Database Model, and it contains the wind building characteristic string used to find the damage and loss functions corresponding to a unique building type.

The huBldgCharWt table stores the relative frequency of each unique building type in a given wind building mapping scheme. These are the percentages shown in the bottom row of Figure 15. In this example, two mitigation options (e.g., secondary water resistance and shutters) have been omitted to fit the figure onto a single page. A stored procedure is used to populate the huBldgCharWt table using information from the huBldgMapping table.

Table 6. Building Wind Characteristics

Characteristic	Value1	Value2	Value3	Value4
Roof Shape				
- Roof Shape I	Hip	Gable		
- Roof Shape II	Hip	Gable	Flat	
Roof Cover				
- Roof Cover Type (H)	Shingle	Metal		
- Roof Cover Type	Built-Up	Single Ply		
- Roof Cover Quality	Good	Poor		
- Secondary Water Resistance	Yes	No		
Roof Deck				
- Roof Deck Attach. I	6d Nails @ 6/12	8d Nails @ 6/12		
- Roof Deck Attach. II	6d Nails @ 6/12	8d Nails @ 6/12	6d/8d Mix @ 6/6	8d @ 6/6
- Roof Deck Attach. III (Metal)	Standard	Superior		
- Roof Deck Attach. (H)	Standard	Superior		
- Roof Deck Age	New or Average	Old		
Roof Frame				
- Roof Frame System	Wood Truss	Steel Joist		
- Joist Spacing	4 ft.	6 ft.		
- Truss Spacing (H)	2 ft.	4 ft.		
- Roof-Wall Conn.	Toe-Nail	Strap		
Fenestrations				
- Window Area	Low	Medium	High	
- Shutters	Yes	No		
- Garage I (Unshuttered Houses)	None	Weak Door	Standard Door	
- Garage II (Shuttered Houses)	None	SFBC 94		
Other Characteristics				
- Wind Debris	Residential	Res./Comm. Mix	Varies by Direction	No Missiles
- Units Per Floor	Single-Unit	Multi-Unit		
- Masonry Reinforcing	Yes (RM)	No (URM)		
- Tie Downs	Yes	No		
- Wall Construction (H)	Double Wall	Single Wall		
- Uplift Restraint (H)	Yes	No		

Note: Garage Yes/No for single family and 1-4 unit dwellings is a building valuation parameter

Table 7. Active Building Wind Characteristics for Each Specific Building Type

Wind Building Characteristic	Wood							Masonry														Concrete						Steel										
	WSF1	WSF2	WSF1 (H)	WSF2 (H)	WMUH1	WMUH2	WMUH3	MSF1	MSF2	MSF1 (H)	MSF2 (H)	MMUH1	MMUH2	MMUH3	MLRM1	MLRM2	MLRI	MERBL	MERBM	MERBH	MECBL	MECBM	MECBH	CERBL	CERBM	CERBH	CECBL	CECBM	CECBH	SPMBS	SPMBM	SPMBL	SERBL	SERBM	SERBH	SECBL	SECBM	SECBH	MHPHUD	MH76HUD
Roof Shape																																							
- Roof Shape I	2	2	2	2				2	2	2	2																												
- Roof Shape II					3*	3*	3*					3*	3*	3*																										
Roof Cover																																							
- Roof Cover Type (H)			2*	2*						2*	2*																												
- Roof Cover Type					2^	2^	2^					2^	2^	2^	2	2		2	2	2	2	2	2	2	2	2	2	2	2				2	2	2	2	2	2		
- Roof Cover Quality					2^	2^	2^					2^	2^	2^																										
- Secondary Water Resistance	2	2	2^	2^	2`	2`	2`	2	2	2^	2^	2`	2`	2`	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
Roof Deck																																							
- Roof Deck Attach. I					2	2	2					2	2	2	2#	2#																							
- Roof Deck Attach. II	4	4			4	4	4	4	4			4	4	4	4#	4#	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a
- Roof Deck Attach. III (Metal)															2`	2`	2`	2	2	2	2	2	2							2`	2`	2`	2	2	2	2	2	2		
- Roof Deck Attach. (H)			2*	2*						2*	2*																												
- Roof Deck Age															2^	2^	2													2	2	2								
Roof Frame																																							
- Roof Frame System															2*	2*																							
- Joist Spacing																2~																							
- Truss Spacing (H)			2~																																				
- Roof-Wall Conn.	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2#	2#																							
Fenestrations																																							
- Window Area																		3	3	3	3	3	3	3	3	3	3	3	3				3	3	3	3	3	3		
- Shutters	2*	2*	2	2	2	2	2	2*	2*	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
- Garage I (Unshuttered Houses)	3^	3^						3^	3^																														
- Garage II (Shuttered Houses)	2#	2#						2#	2#																														
Other Characteristics																																							
- Wind Debris															4	4		4	4	4	4	4	4	4	4	4	4	4	4				4	4	4	4	4	4		
- Units Per Floor																2^																							
- Masonry Reinforcing								2	2			2	2	2	2	2	2																						
- Tie Downs																																						2	2
- Wall Construction (H)			2																																				
- Uplift Restraint (H)			2																																				
Combinations in HAZUS-MH	160	160	200	40	128	128	128	320	320	40	40	256	256	256	352	544	12	96	96	96	96	96	96	48	48	48	48	48	48	6	6	6	96	96	96	96	96	96	4	4
Future Mitigation Cases	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
			Gable/H		64	64	64					128	128	128	256	256	12	Masonry Eng. = Steel Eng							48	48	48	48	48	48	6	6	6	96	96	96	96	96	96	4	4
* branching characteristic			Flat		64	64	64					128	128	128	96	288																							Current

^ conditional characteristic (active if Shutters Not Installed OR if Roof Shape is Flat OR if Roof Frame System is Steel Joist OR if roof deck is ... HurDam mitigation runs completed in 2001

conditional characteristic (active if Shutters Installed or if Roof Frame System is Wood Truss) HurDam mitigation runs completed in MR1 MUH+M

~ conditional characteristic (active if Roof Frame System is Steel Joist and Number of Units is Multi-Unit OR if single wall and no uplift restraint) HurDam mitigation runs completed in MR2

` conditional characteristic (active if Roof Shape is Gable or Hip OR if Roof Deck is Metal and Roof Deck Age is New or Average) Grand T

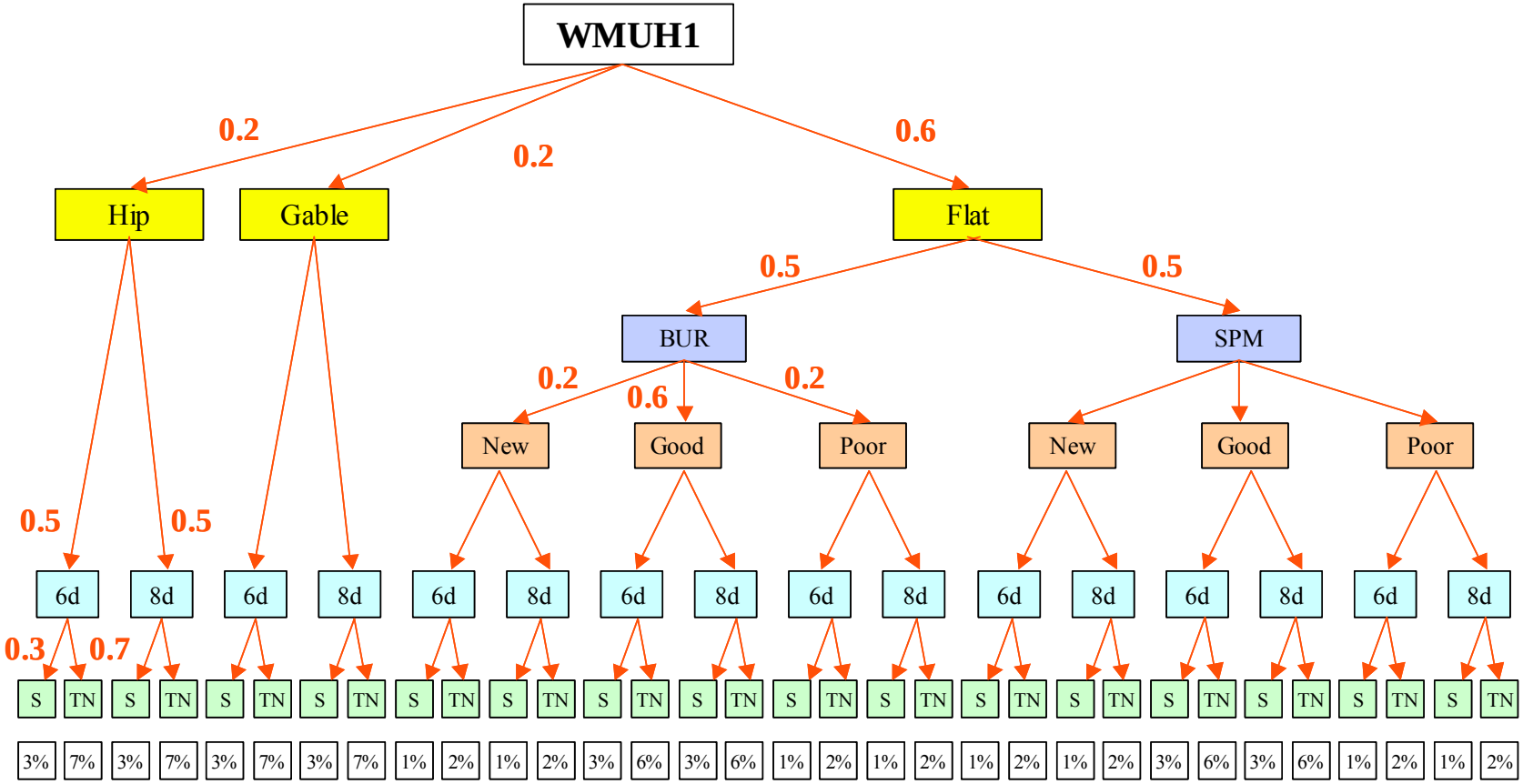

Figure 15. WMUH1 Characteristics (Secondary Water Resistance and Shutters Not Shown for Clarity)

3.1.1.1.2.3 Essential Facilities

The inventory data for Essential Facilities (EF) are stored in the tables shown in Figure 16. The common EF inventory data are stored in five tables: hzCareFlty, hzEmergencyCtr, hzFireStation, hzPoliceStation, and hzSchool tables. Each of these tables inherits attributes from the hzEF entity. The hurricane-specific attributes for each EF are stored in the corresponding “hu” tables: huCareFlty, huEmergencyCtr, huFireStation, huPoliceStation, and huSchool tables.

Each EF must be mapped either to a specific building type and a wind building mapping scheme or to an essential facility occupancy class. If the user provides a specific building type and a wind building scheme, the wind building mapping scheme must appear in the huBldgMappingList table. This is the same list used to manage wind building mappings for the general building stock (see Figure 14). If the user only provides an EF occupancy class, the EF occupancy class is mapped to a general building specific stock occupancy in the huEfOccMapping table and the specific occupancy is used.

3.1.1.1.2.4 User Defined Facilities

The User-Defined Facility tables are shown in Figure 17. These tables are used to store data for facilities that were not explicitly included in the default study region data. The user-defined facility tables are similar to the essential facilities tables in that the facilities are indexed using either an occupancy type or occupancy mapping scheme or by a specific building type and building mapping scheme.

The building types and occupancy classes are from the general building stock tables found in Figure 14.

3.1.1.1.2.5 Other Types of Facilities

Hazardous Materials, High Potential Loss Facilities, Pipelines, Lifeline Facilities, Lifeline Segments, and Lifeline Bridges are additional types of facilities in the template database. The tables for these facilities are shown in Figure 18 through Figure 23. Analysis of these facilities is currently beyond the scope of the Hurricane Model; however, these facilities are included in the

data model to allow the user to view their locations in the inventory and results maps. The “hu” tables are placeholders for future hurricane-specific data.

The Hurricane Model also allows the user to view other reference and non-facility data. These data include Demographics, Vehicles, and Agriculture, which are accessible from the Inventory menu. Figure 24 shows the ERD for the reference and non-facility data. The data in these tables are available for display and mapping. In addition, the demographics data are used in the RES1 Valuation methodology and in the shelter requirement methodology.

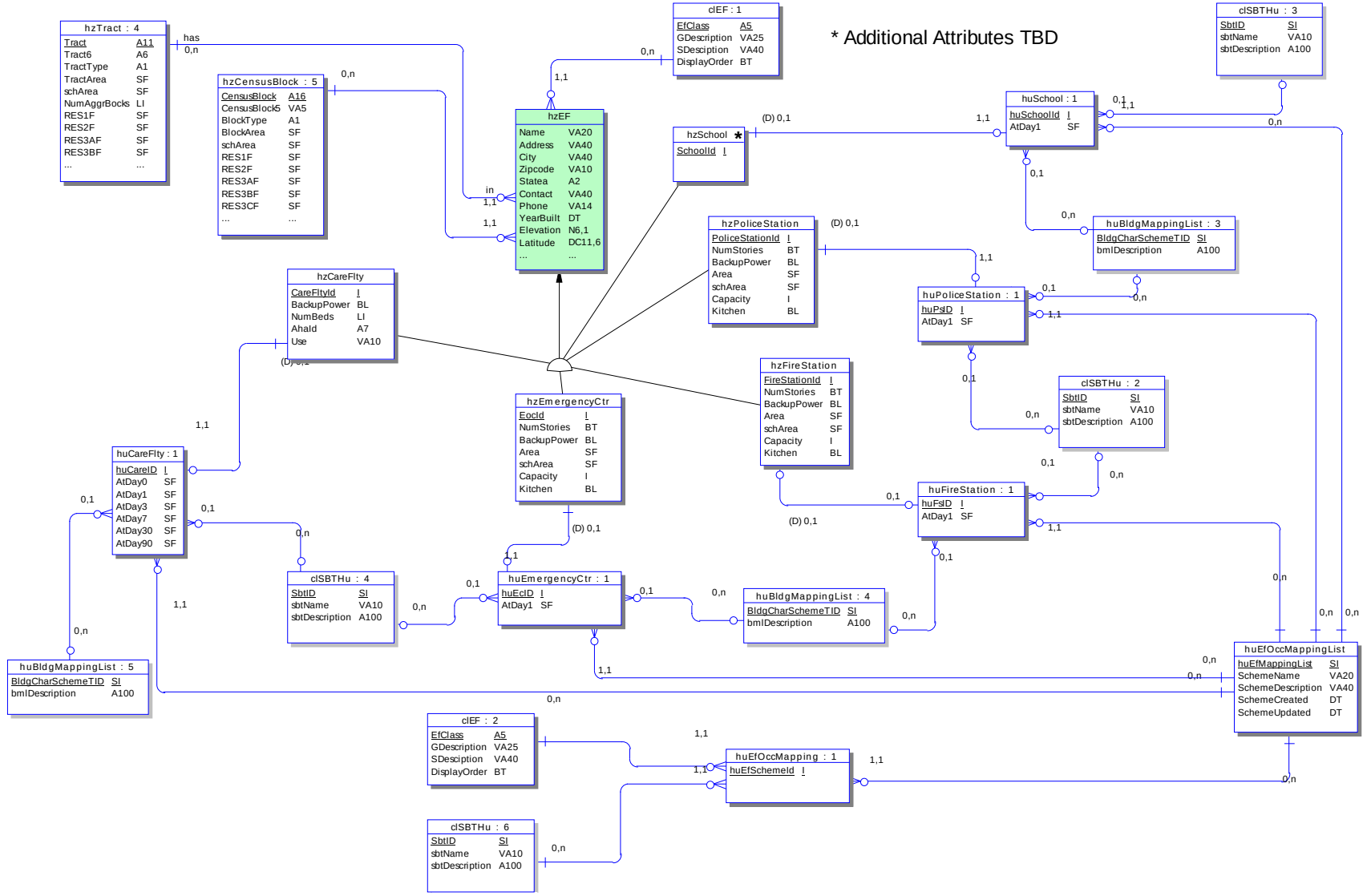

Figure 16. Essential Facilities Data Tables

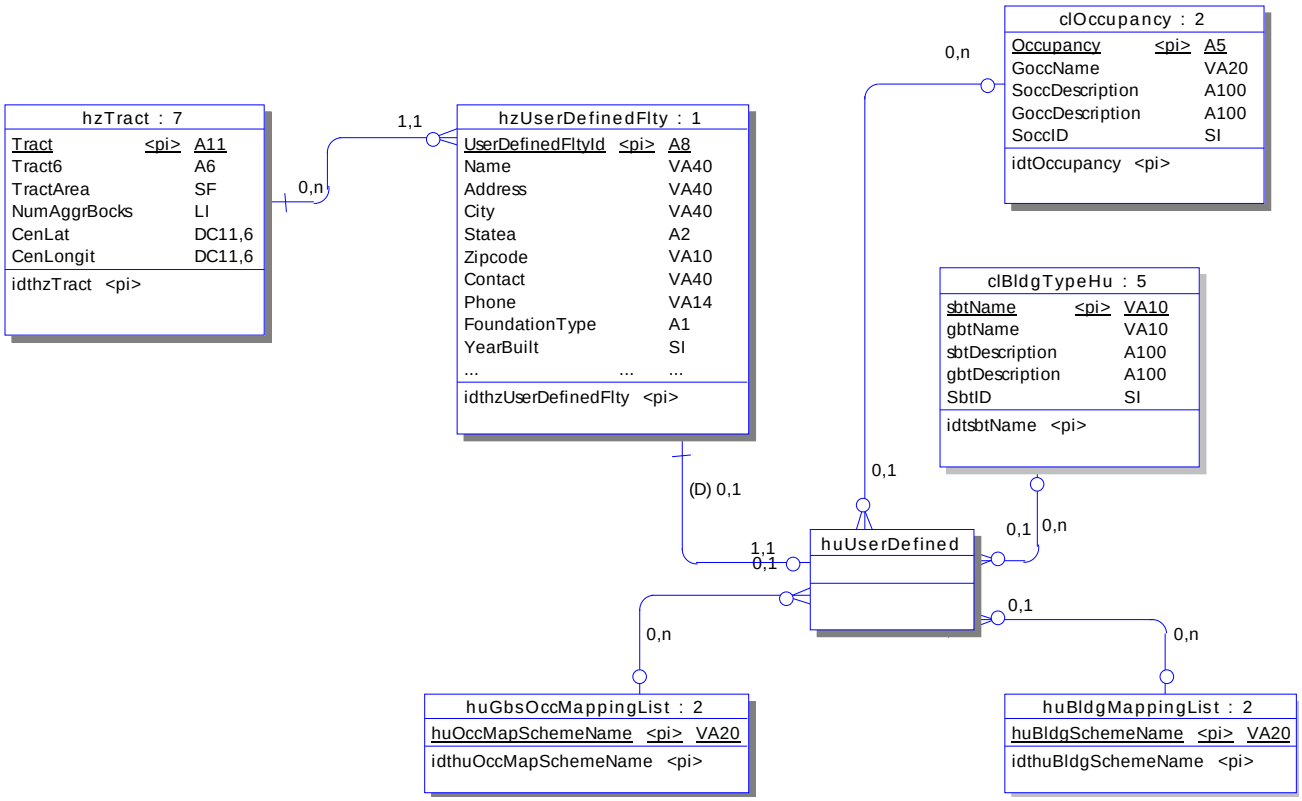

Figure 17. User-Defined Facilities Data Tables

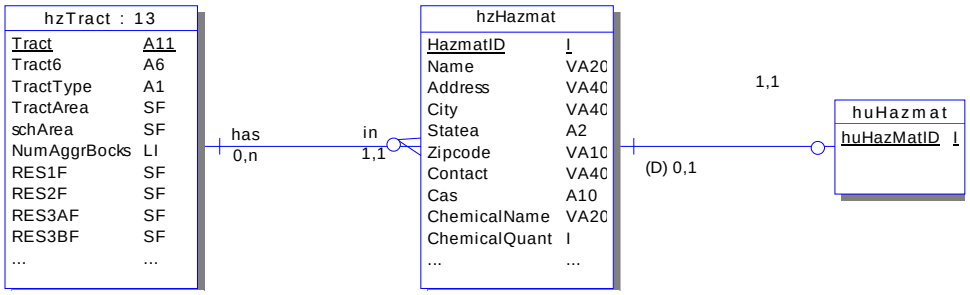

Figure 18. Hazardous Material Facilities Data Tables

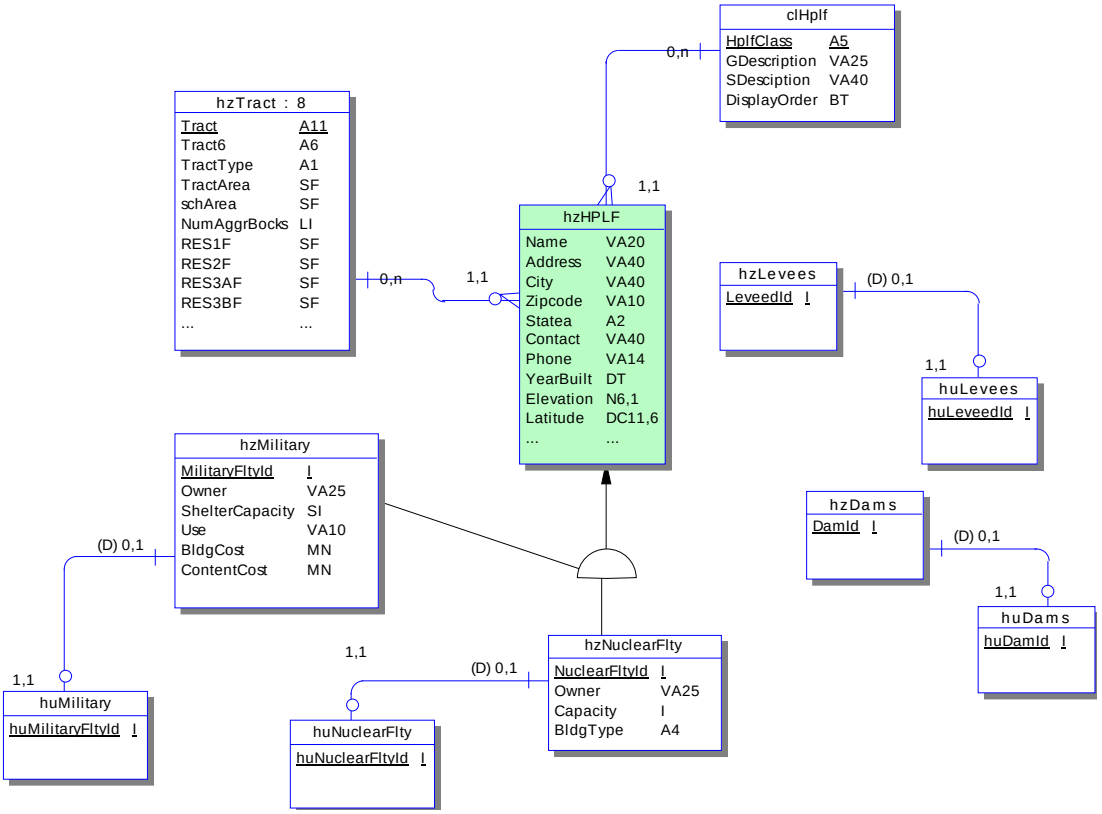

Figure 19. High Potential Loss Facilities Data Tables

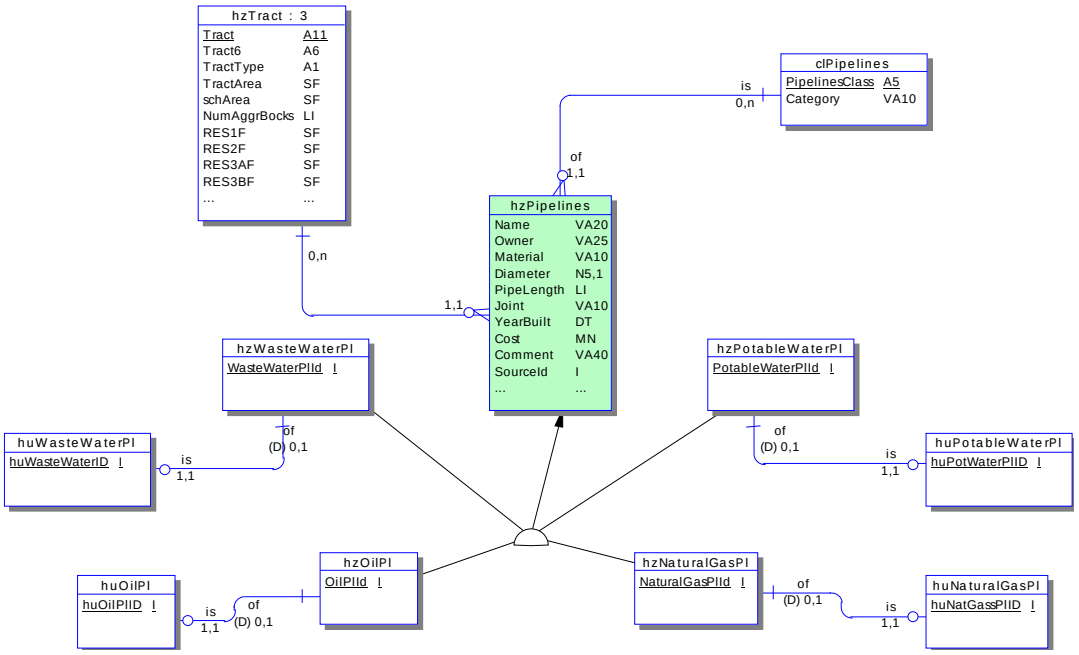

Figure 20. Pipeline Data Tables

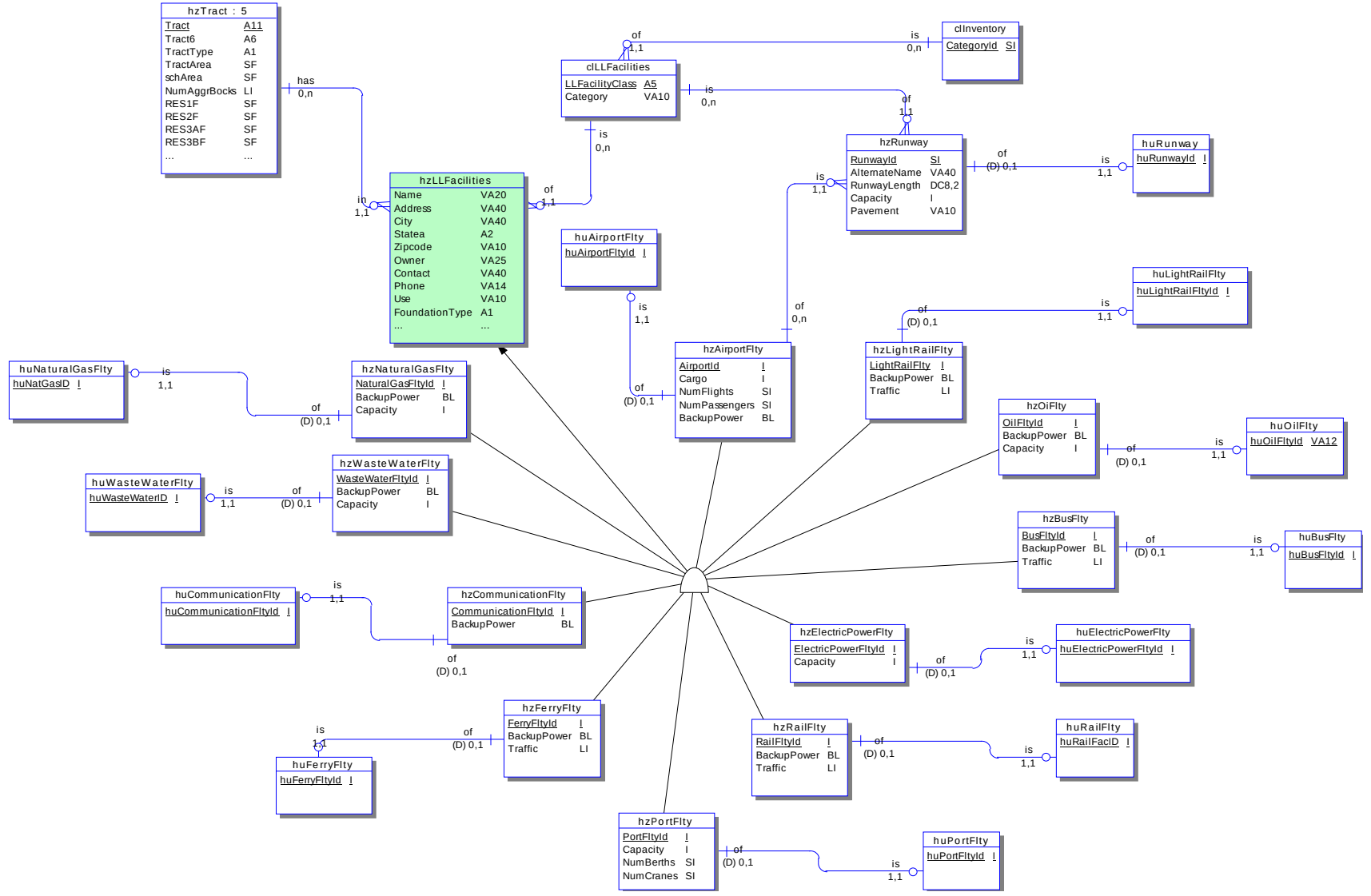

Figure 21. Lifeline Facilities Data Tables

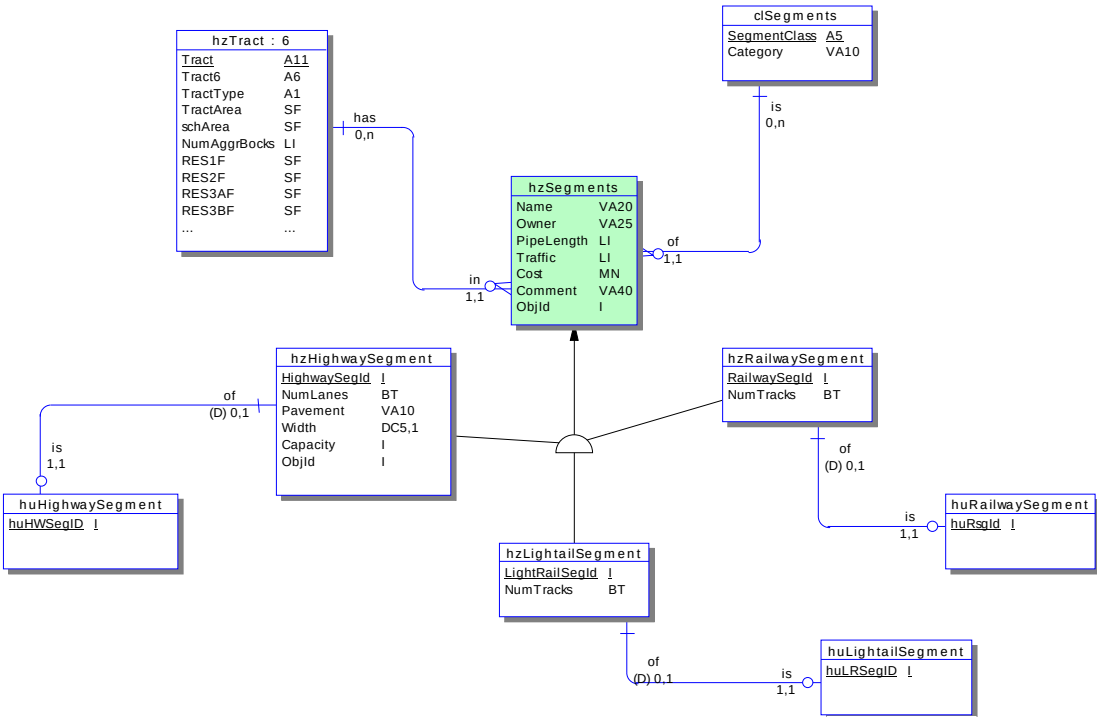

Figure 22. Lifeline Segments Data Tables

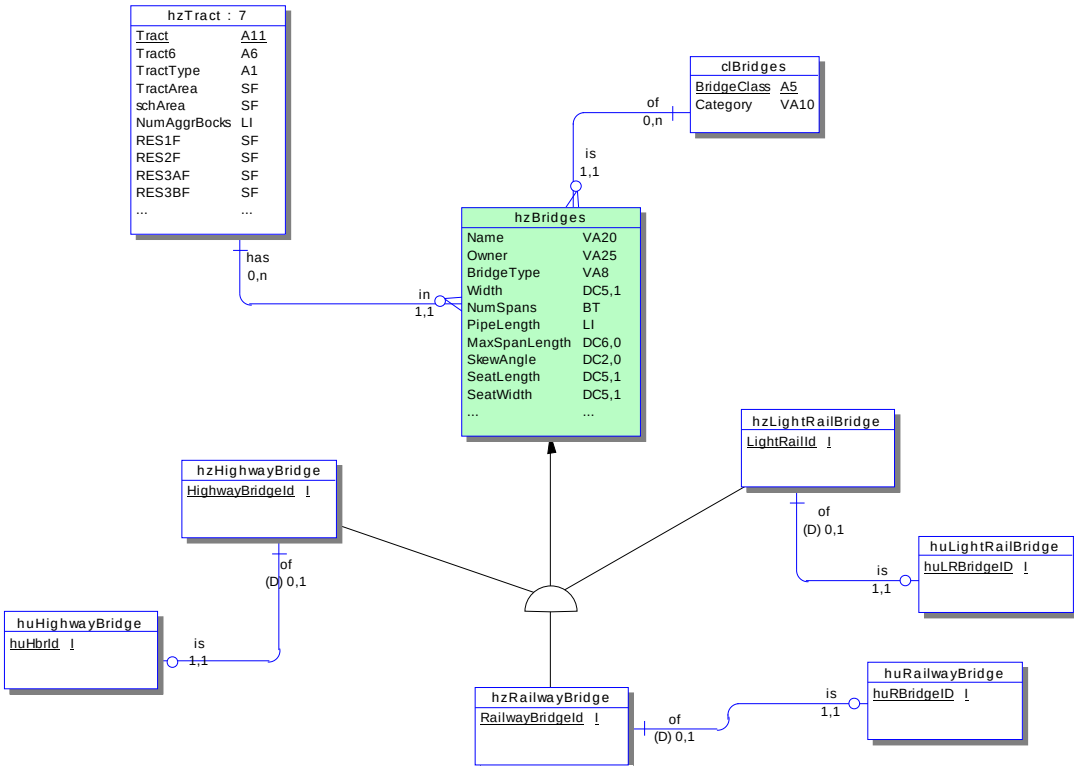

Figure 23. Lifeline Bridge Data Tables

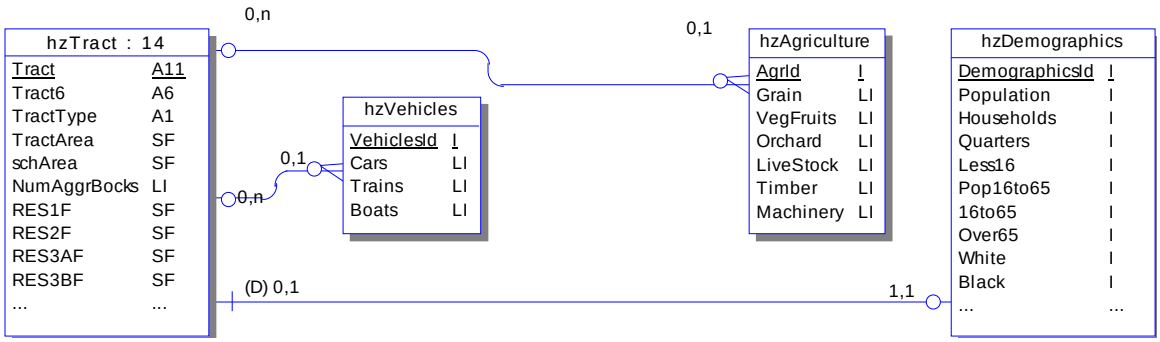

Figure 24. Other Data Tables

3.1.1.1.2.6 Analysis Parameters

The analysis parameters stored in the database are used in the damage and loss calculations. The data stored in these tables are building economic analysis parameters, shelter parameters, and surface roughness lengths.

Building economic analysis parameters and shelter parameter requirements are shown in Figure 25 and Figure 26. The methodologies for economic losses and shelter requirements are described in the HM Technical Manual.

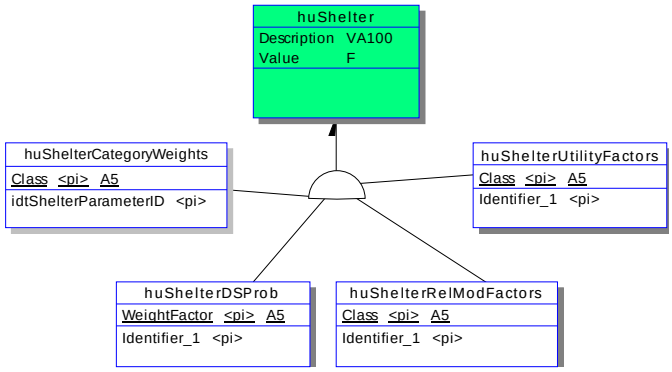

Figure 25. Shelter Parameters Tables

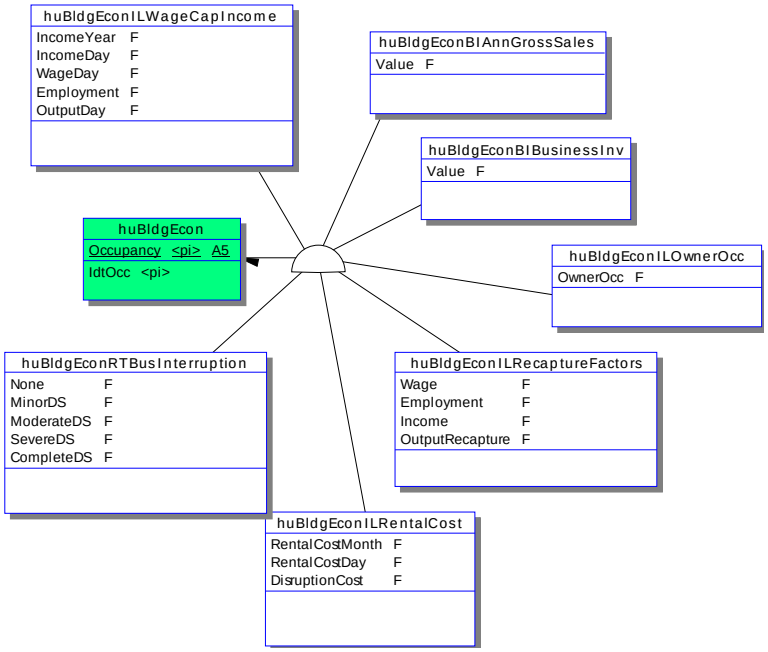

Figure 26. Building Economic Loss Parameters Tables

Figure 27 shows the Terrain table. The terrain table stores the surface roughness for each census tract. These data are set by default during aggregation of the study region. The user is permitted to change the surface roughness for each census tract in the user interface.

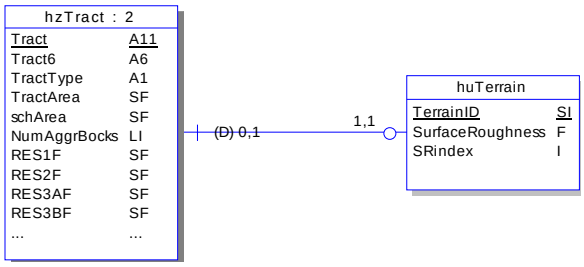

Figure 27. Terrain Tables

3.1.1.1.2.7 Results

Hurricane analysis results are stored in the following tables: General Building Stock (Figure 28), Debris (Figure 30), Shelter Requirements (Figure 30), Essential Facilities (Figure 31) and User Defined Facilities (Figure 32).

3.1.1.1.2.7.1 General Building Stock Results

The General Building Stock (GBS) analysis results are stored in two main tables: huBldgTypeResults and huOccResults. The data in each table are indexed by census tract (or census block), occupancy or building type, and return period. The huOccResults table contains the results for general and specific occupancy classes, and the results for general and specific building types are stored in huBldgTypeResults table.

The results tables shown in Figure 28 inherit the bCurrent attribute from the huResults entity. This attribute is used to determine if the results in these tables correspond to the current hurricane analysis scenario.

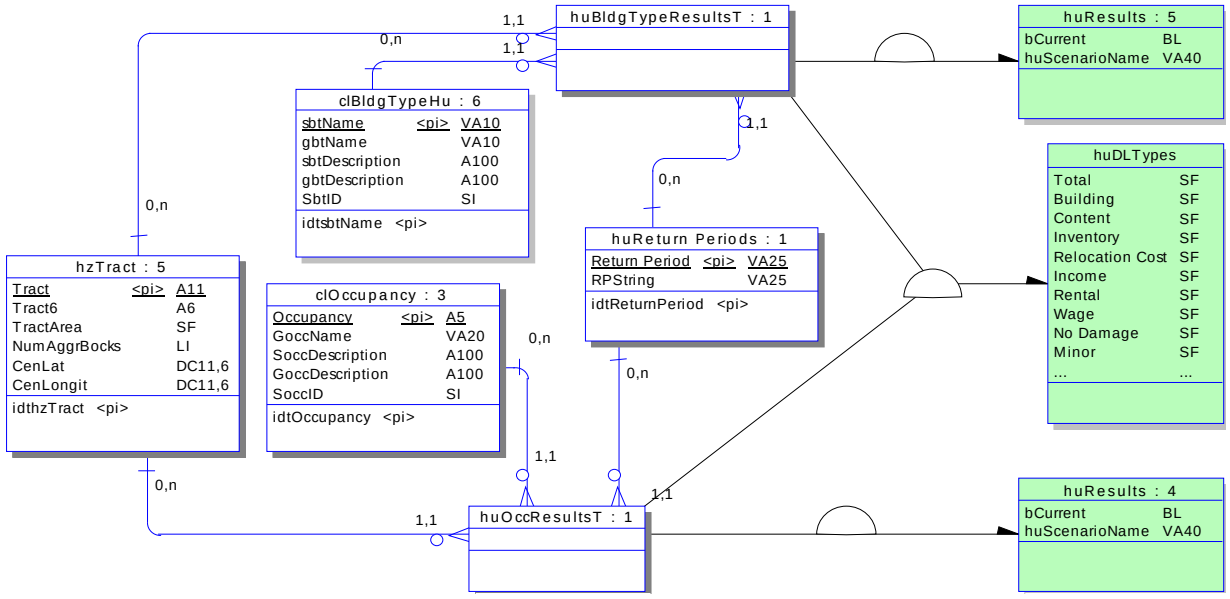

Figure 28. General Building Stock Results Tables

Also included in the general building stock tables are result summary tables. These tables are used to assist the summary reports. They are populated by the calculation engine prior to completion a hurricane analysis. These tables are shown in Figure 29.

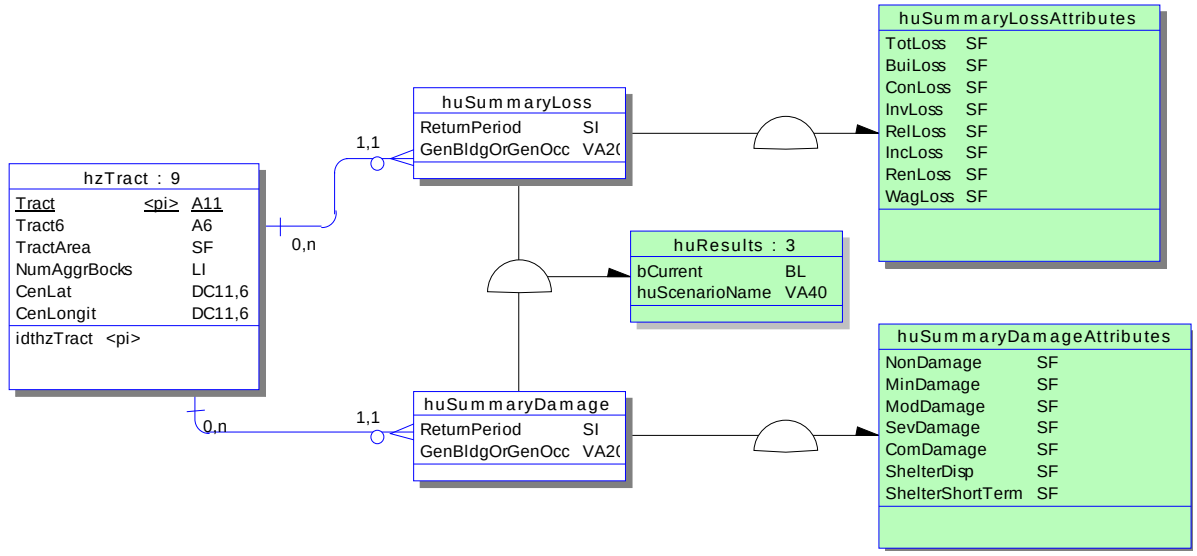

Figure 29. Building Stock Summary Results Tables

3.1.1.1.2.7.2 Shelter and Debris Results

The analysis results for debris are given for two types of building debris: (1) brick, wood, or other debris, and (2) reinforced concrete or steel members. Shelter requirements estimates are provided in terms of displaced households and short term shelter needs. Results are stored for each census tract (or census block).

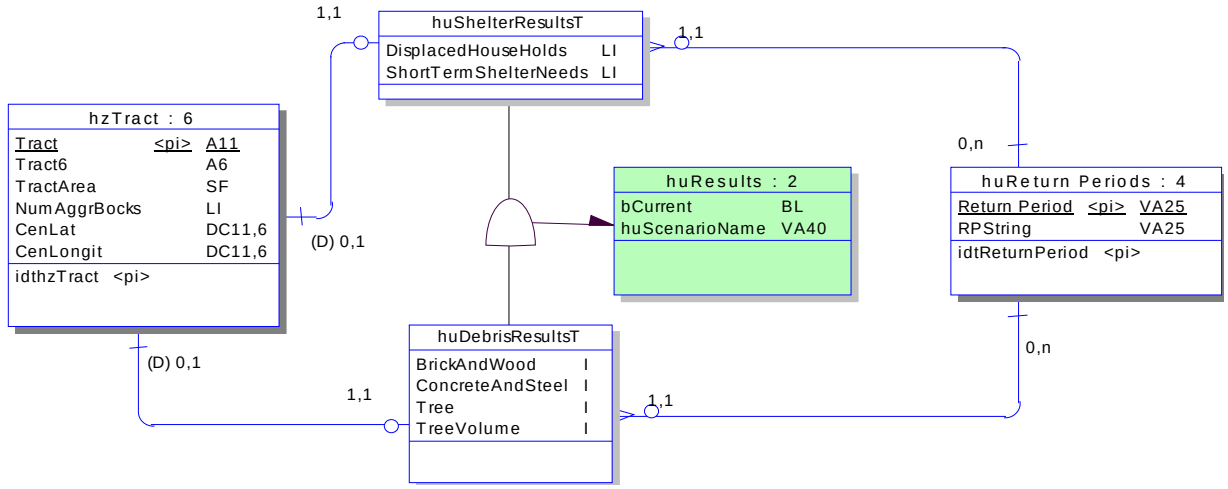

Figure 30. Shelter and Building Debris Results Tables

3.1.1.1.2.7.3 Essential Facility Results

Essential Facility (EF) results are stored in the same inventory tables used to store the hurricane-specific parameters of the five EF classes. Figure 31 shows the relationship between the damage states and restoration of function for each of the five types of essential facilities. The damage states for EF are: minor, moderate, severe and complete. The four damage states are common to each of the EF. The restoration of function attributes are different for each EF and have been added to the “hu” entities accordingly.

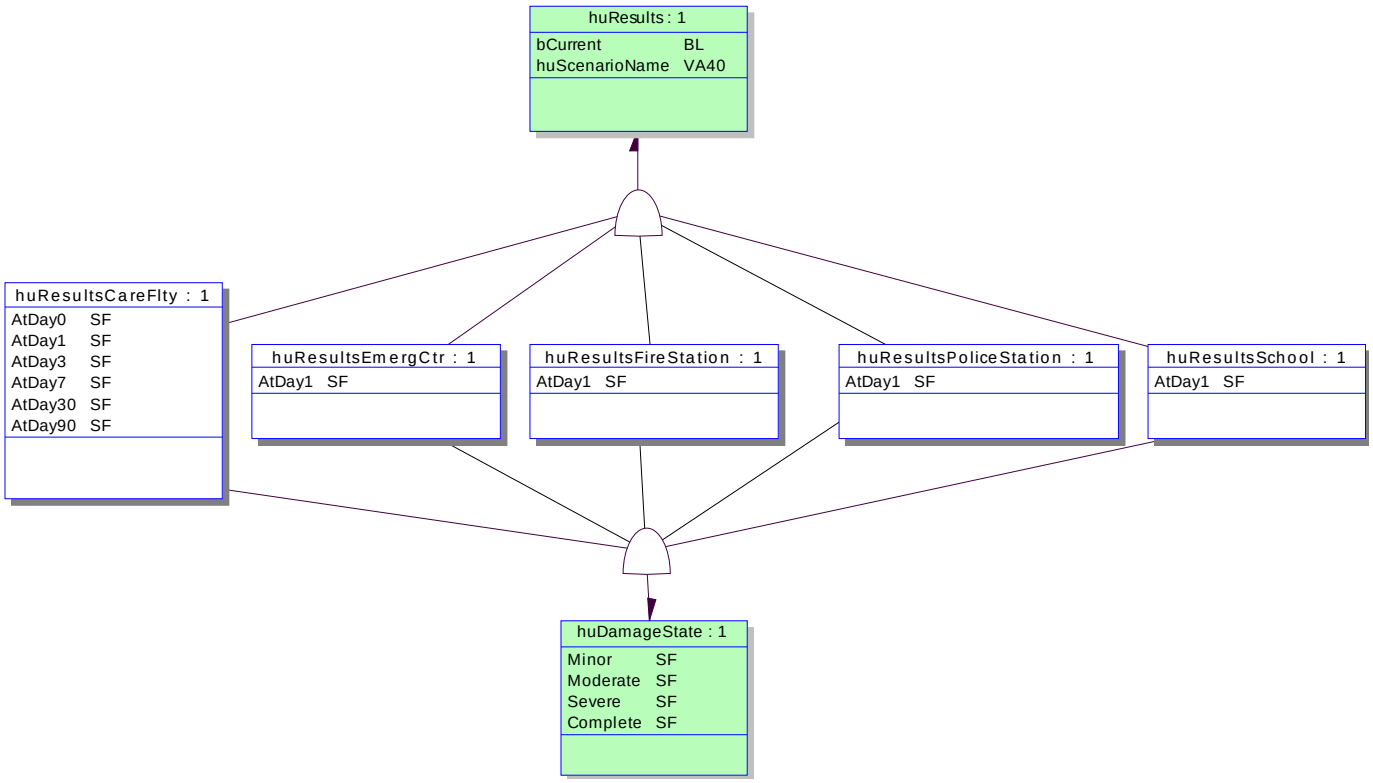

Figure 31. Essential Facilities Results Tables

All five of the EF tables also inherit the bCurrent attribute and the huScenarioName attribute from the huResults entity. The bCurrent attribute will be False if the current results are not valid.

3.1.1.1.2.7.4 User-Defined Facility Results

The User-Defined Facilities (UDF) results are similar to the essential facilities results, except that restoration of function is not computed for user-defined facilities. Probabilities are stored in the inventory table for the minor, moderate, severe and complete damage states.

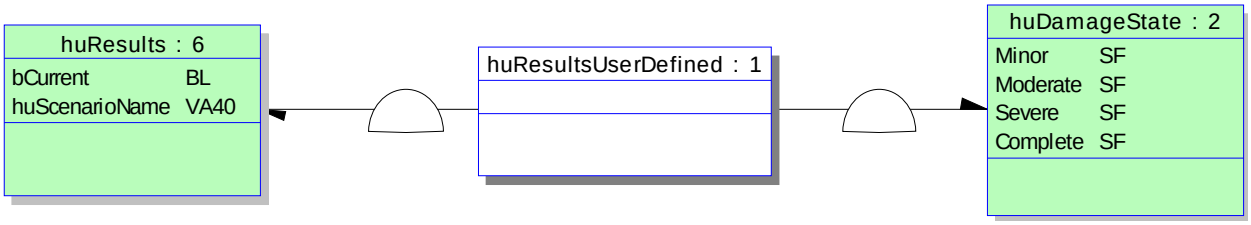

Figure 32. User Defined Facilities Results Tables

3.1.1.2 Physical Data Model

The Physical Data Model (PDM) is derived from the Conceptual Data Model (CDM). Like the CDM, it is divided into a System Database Model and a Template Database Model. The PDM shows the implementation design of the database. Each unique CDM entity is now a PDM table, and each inherited CDM entity is now explicitly incorporated into its proper PDM table.

Another key difference between the CDM and the PDM is the addition of views, stored procedures, and triggers. These items and the PDM diagrams are discussed in the following sections. A complete data dictionary for the System and the Template PDMs is provided in Section 3.1.1.3.

The HAZUS PDM has been implemented using the Microsoft Data Engine (MSDE).

3.1.1.2.1 System Database Model

The following sections present the Physical Data Model design of the System Database.

3.1.1.2.1.1 System Tables

The following figures show the PDM design for the hurricane portion of the system database. As mentioned earlier, the system database is used to store data used by all study regions. Tables with the “Hu” suffix are hurricane-specific. The tables stored in the system database are the deterministic scenario tables, the historic storm scenario tables, the wind speed results tables, and the analysis function tables. Figure 33 shows how the hurricane deterministic scenario tables are referenced and the historic storm list are shown in Figure 34.

As discussed in the CDM, the user has the choice to run a probabilistic scenario, deterministic storm scenario, or a historic storm scenario. The huScenario table stores only stores deterministic hurricane scenario. The historic storm scenarios are chosen from a list of historic storms listed in the huHistoricStormList table. The probabilistic storm data are not stored in the database but are stored in binary files located on the State DVD Data.

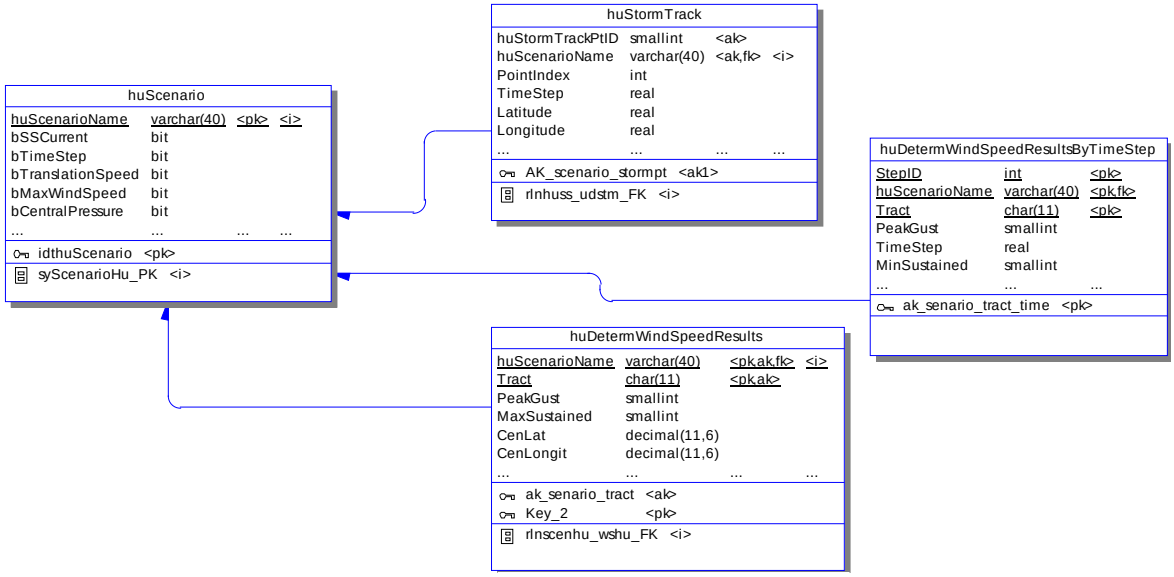

Figure 33. Hurricane Scenario Tables

The huScenario table stores the parameters, such as by time step or by translation speed, that the user chose when creating a storm track. The actual storm track point parameters are stored in the huStormTrack table. These parameters include storm track points, time steps and track point location. Data from this table can be accessed using the huScenarioName. Specific information about each point is accessed using the huStormTrackPtID field.

The bSSCurrent flag in the huScenario table is used to indicate which scenario is current. There is a similar flag in the huHistoricStormList table that acts the same. The actual current scenario is stored in the Registry. The registry key will indicate if the current scenario by the scenario name. The scenario name will be probabilistic, a name of a historic storm, or then name of a user-defined/deterministic scenario.

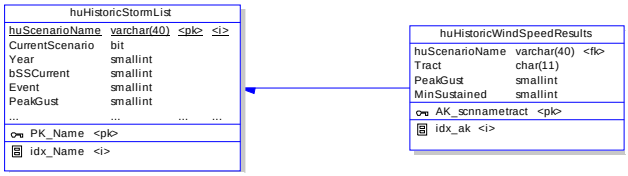

Figure 34. Historic Storm List Tables

As shown in Figure 33, the deterministic storm scenario results are calculated by the Wind Field Model and then stored in the huDetermWindSpeedResults table and in the huDetermWindSpeedResultsByTimeStep table. These tables are index by the huScenarioName and by Census Tract. They hold the wind speed results by peak gust and by one-minute sustained wind speed. The huDetermWindSpeedResultsByTimeStep is also indexed by time step. The time step wind speed results are used in the case of a Hawaii-based study region to model topographic speedups as a function of wind direction.

The historic wind speeds are stored in the huHistoricWindSpeedResults table, as shown in Figure 34. These are also indexed by huScenarioName and by Census Tract.

The damage and loss function tables are shown in Figure 35. Each damage or loss function is indexed by a wbID from the huListOfWindBldgTypes table, a TerrainID from the huTerrain table, and a DamLossDescID from the huDamLossFunDescription table.

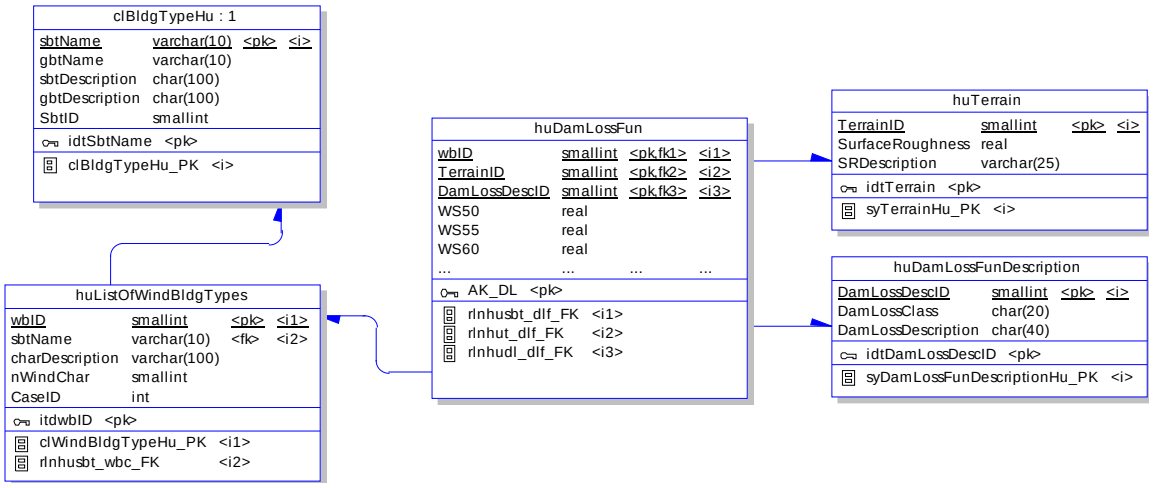

Figure 35. Damage and Loss Function Tables

Also included in the system database are user interface support tables. These tables store data grid properties in tables shown in Figure 36 and analysis output options in Figure 37 and in Figure 38.

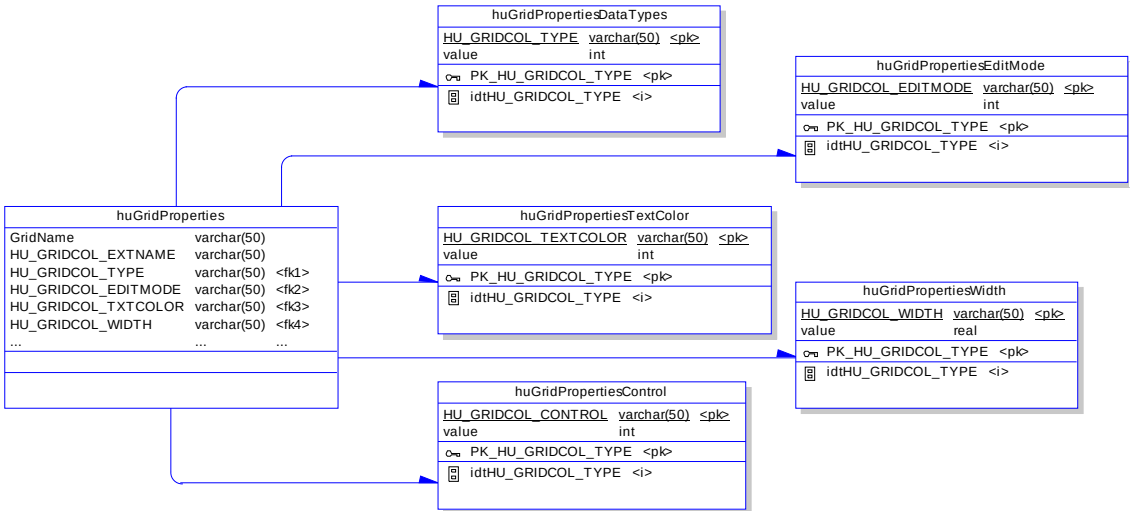

Figure 36. User Interface Data Grid Properties Tables

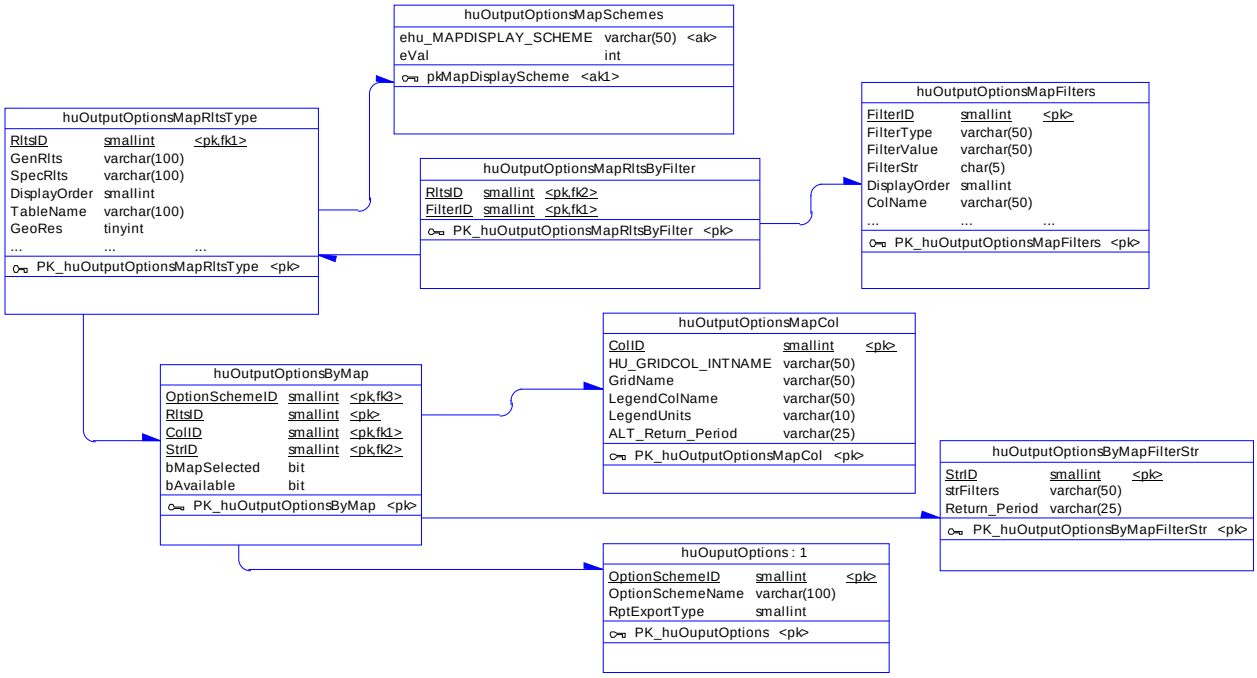

Figure 37. Output Options by Map Table

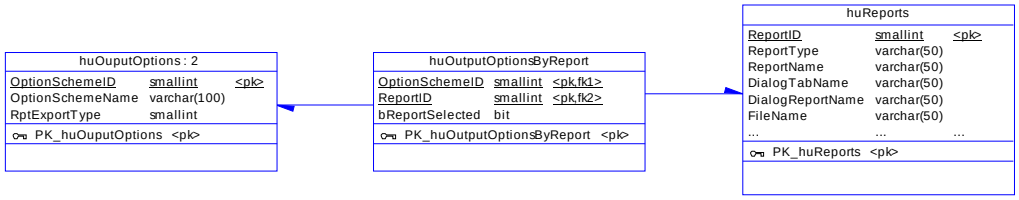

Figure 38. Output Options by Report Table

3.1.1.2.1.2 System Views

Views are used to display a subset of the data from one or more tables. They are designed in the PDM and implemented in the System Database. The Hurricane Model does not use views in the system database.

3.1.1.2.1.3 System Stored Procedures and Triggers

Usually included in the PDM are stored procedures and triggers. Stored procedures are named collections of SQL statements stored on the server. These can be called directly from the model to perform user-defined database functions. A trigger is a stored procedure that is invoked automatically whenever an attempt is made to insert, update, or delete data in a table. Triggers are associated with a table and cannot be called directly. The Hurricane Model does not implement or use stored procedures and triggers in the System Database.

3.1.1.2.2 Template Database Model

The following sections present the Physical Data Model design of the Template Database. The template PDM is divided in the same manner as the template CDM. Entities are replaced with tables, and relationships are replaced with references.

3.1.1.2.2.1 Template Tables

The general building stock inventory and exposure tables are shown in Figure 39. Both the “hz” tables and the “hu” tables are shown. The building count by specific building type is stored in the huBldgCountSbtT table for census tracts and huBldgCountSbtB table for census blocks. The same is true for the building exposure tables. Building exposure by specific building type is stored in the huExposureSbtT table and the huExposureSbtB table.

The wind building characteristics PDM tables are shown in Figure 40. As discussed in Section 3.1.1.1.2.2, these tables store the distributions of wind building characteristics for each specific building type in each census tract (or census block).

The general occupancy mapping tables were also discussed in Section 3.1.1.1.2.2. The CDM huValuesBySbtPercent entity has been inherited by the huGbsOccMapping table. The PDM design is shown in Figure 41.

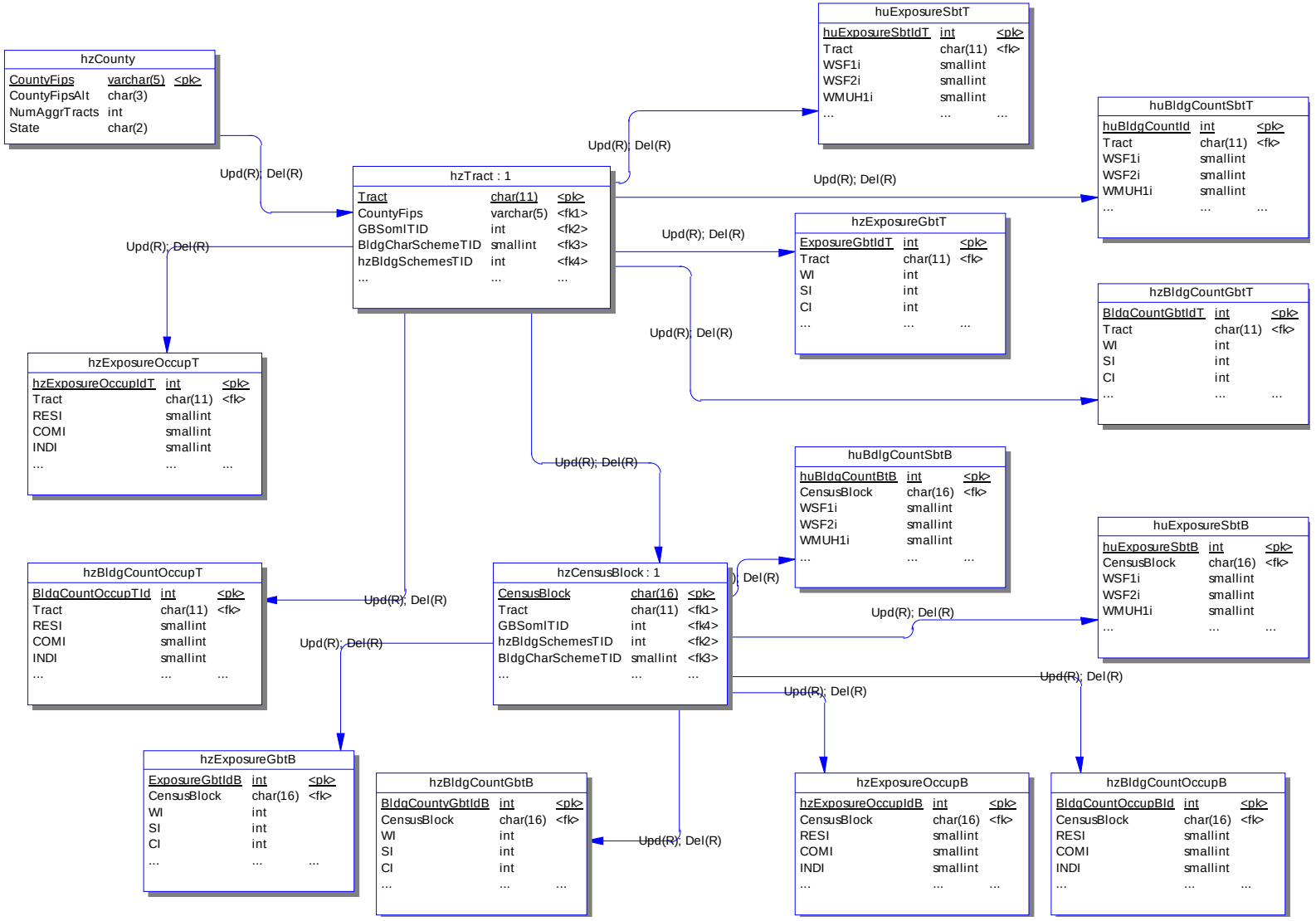

Figure 39. General Building Stock Exposure and Count Tables

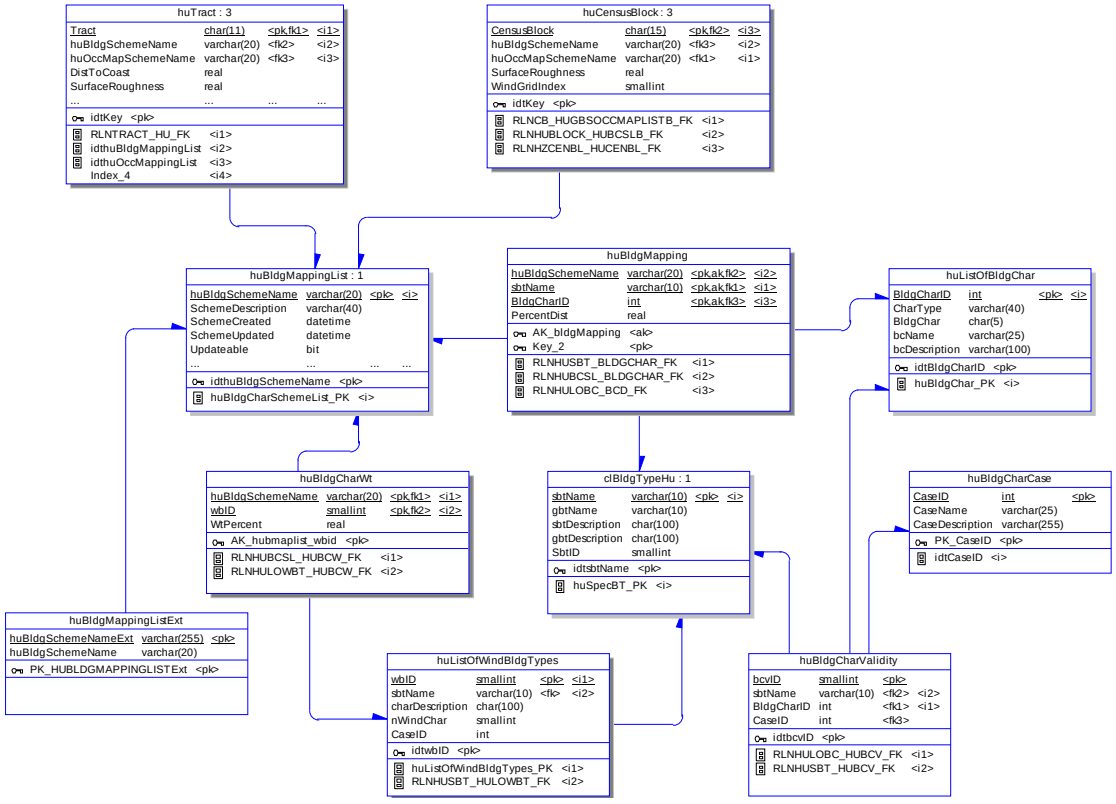

Figure 40. Wind Building Characteristics Tables

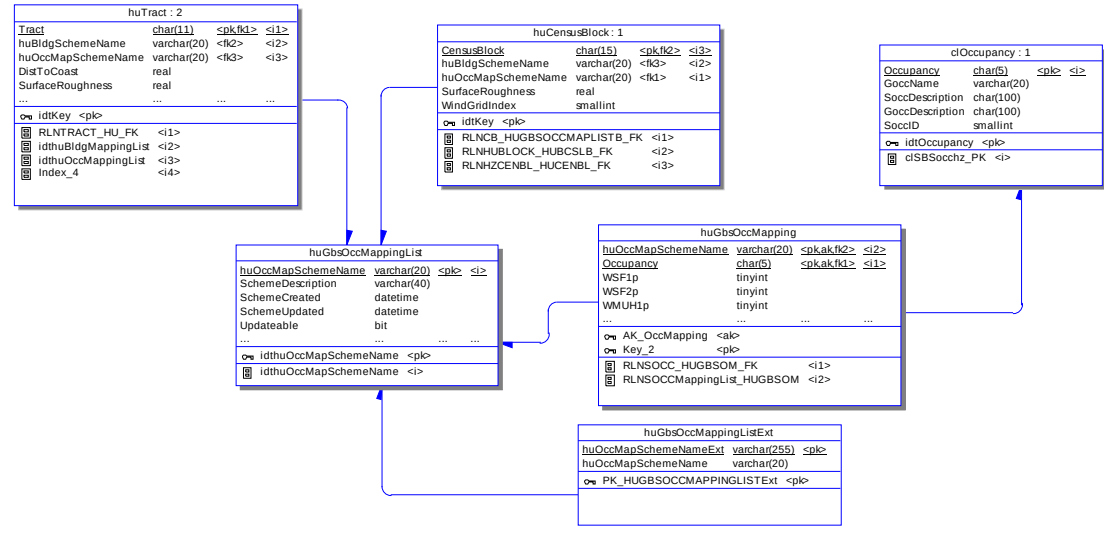

Figure 41. General Building Type and Specific Building Type Occupancy Mapping Tables

The essential facilities PDM design is shown in Figure 42. The hzEF entity attributes have been inherited by the hzCareFlty, hzFireStation, hzEmergency, hzSchool, and hzFireStation. The hurricane-specific EF tables are referenced by the common EF tables, the clBldgTypehu table, and the huEfOccMappingList table as described in Section 3.1.1.1.2.3.

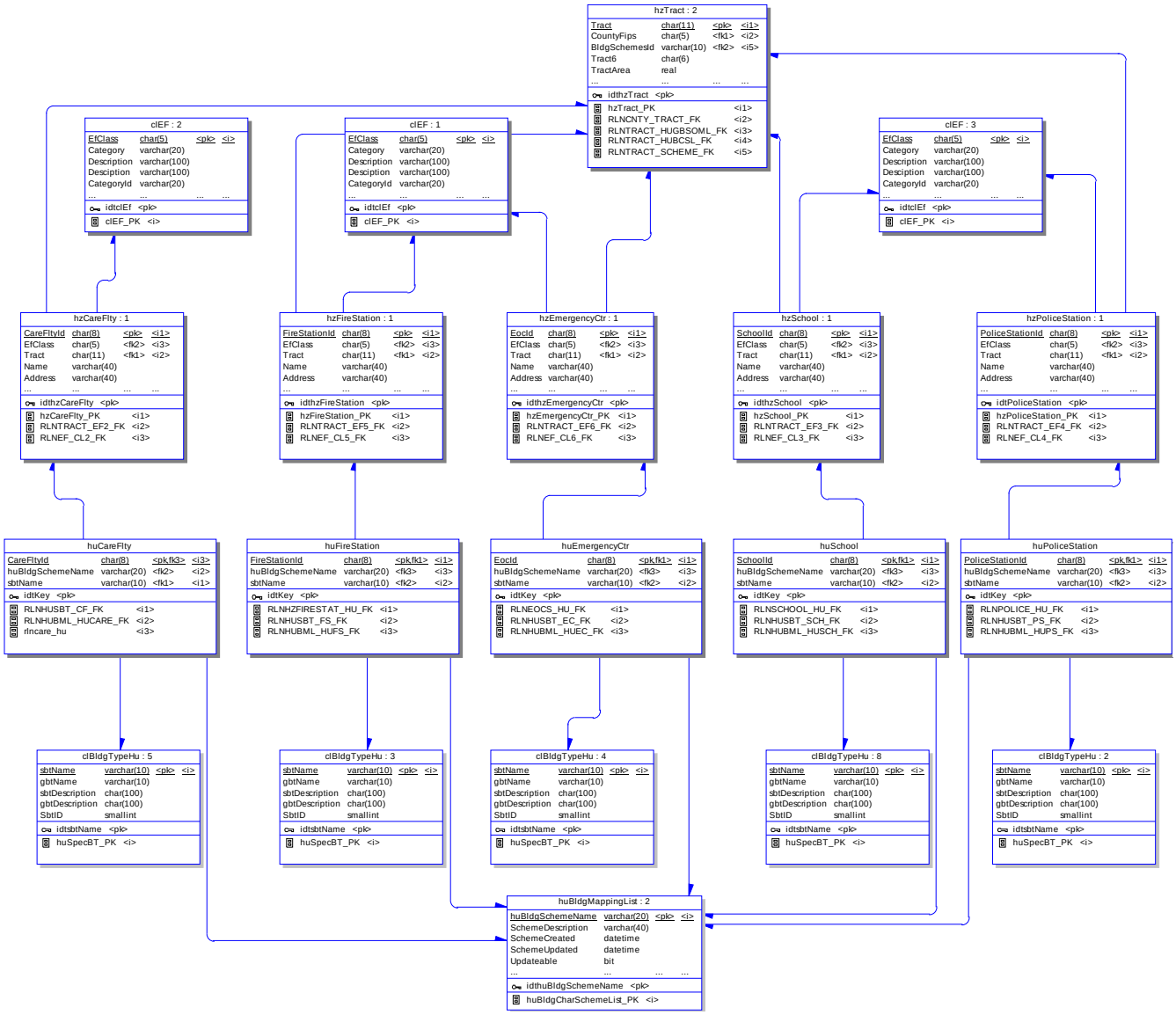

Figure 42. Essential Facilities Tables

The user-defined facilities PDM design is shown in Figure 43. For these facilities, there is a one-to-one correspondence between the PDM and CDM.

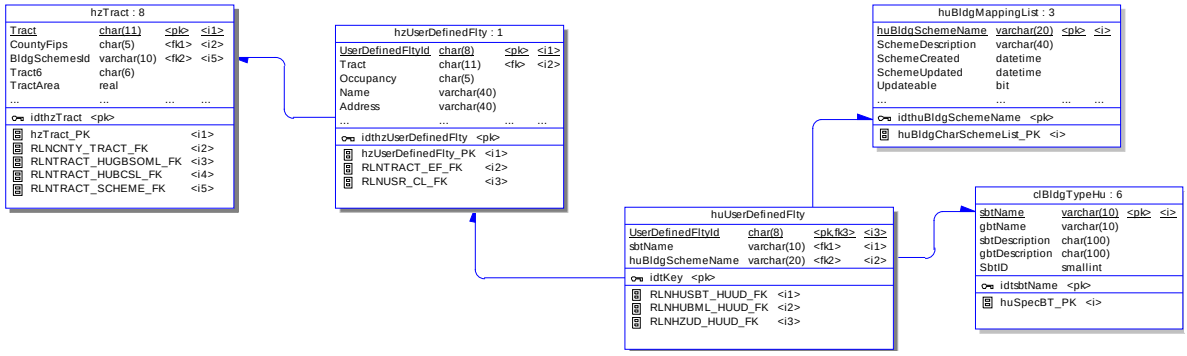

Figure 43. User Defined Tables

The PDM design for Hazardous Materials, High Potential Loss Facilities, Pipelines, Lifeline Facilities, Lifeline Segments, and Lifeline Bridges are shown in Figure 44 through Figure 49. Because damage and loss analysis for these facilities are currently beyond the scope of the HM, the “hu” tables for these facilities are empty.

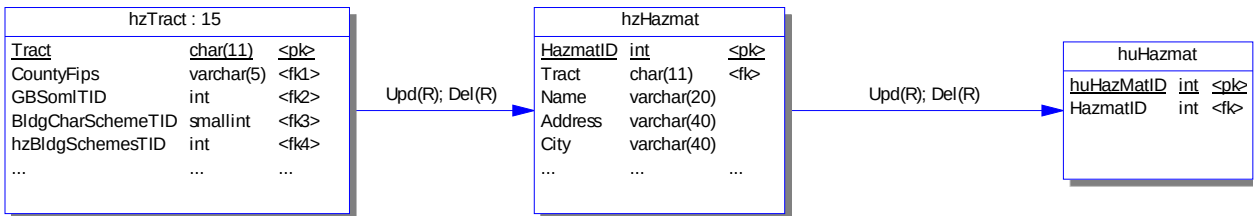

Figure 44. Hazardous Material Tables

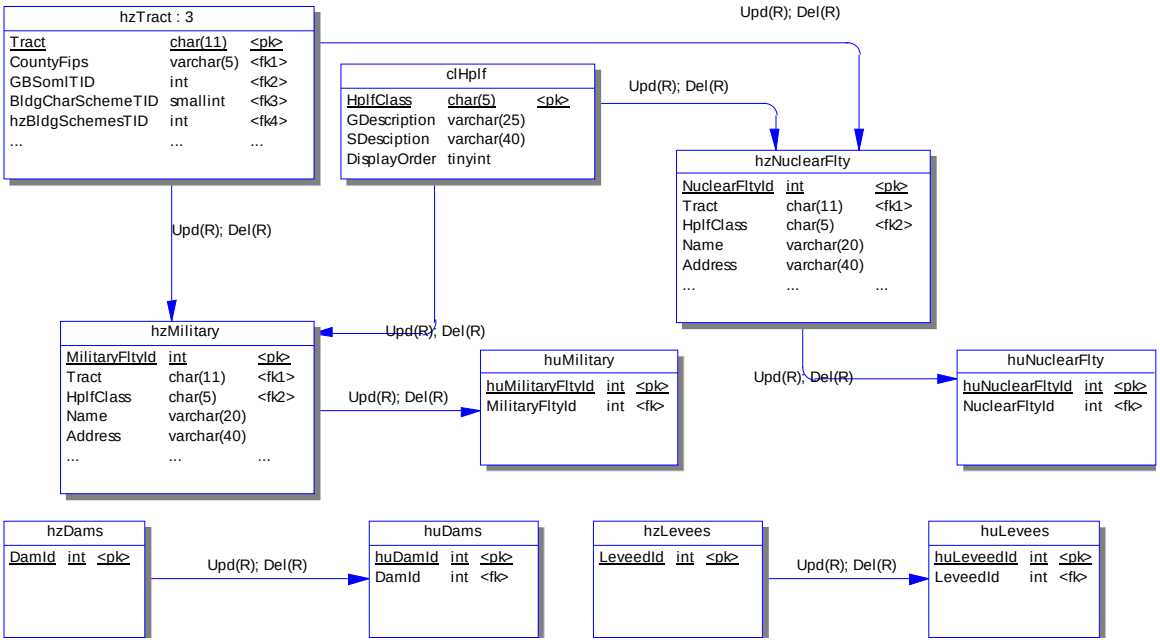

Figure 45. High Potential Loss Facilities Table

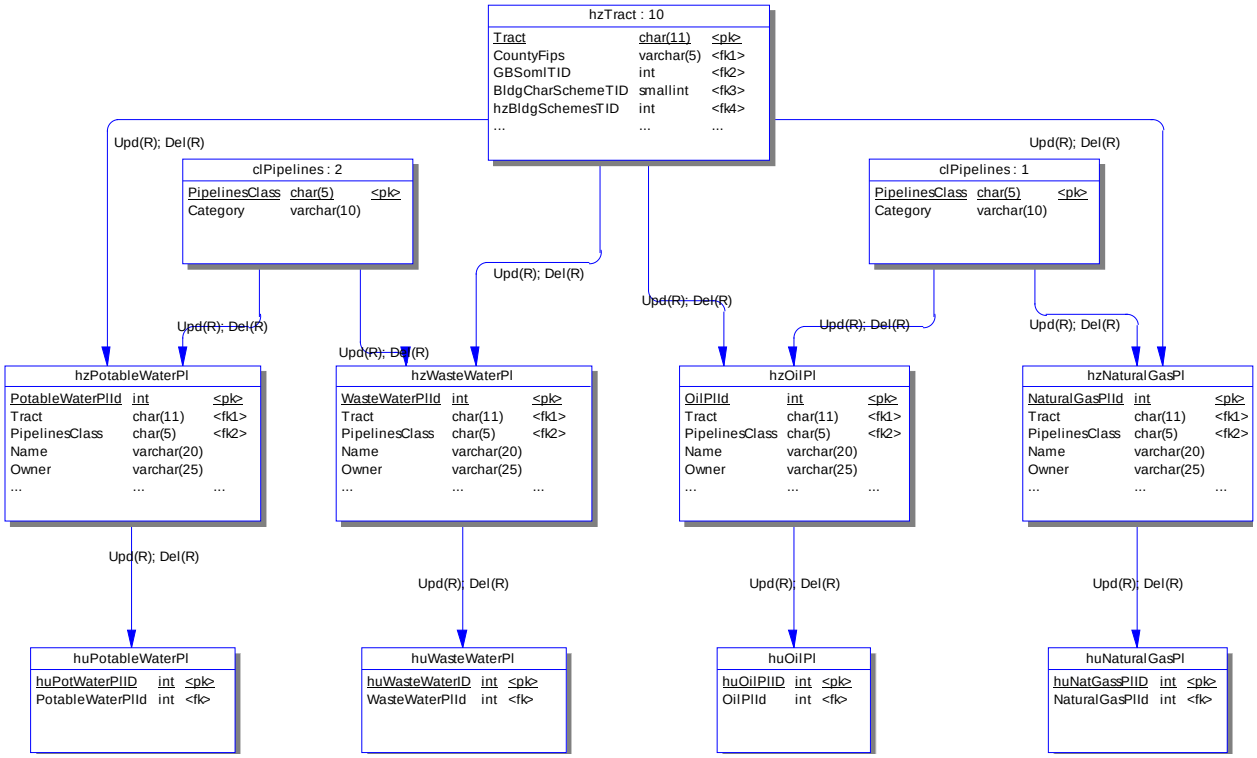

Figure 46. Pipelines Tables

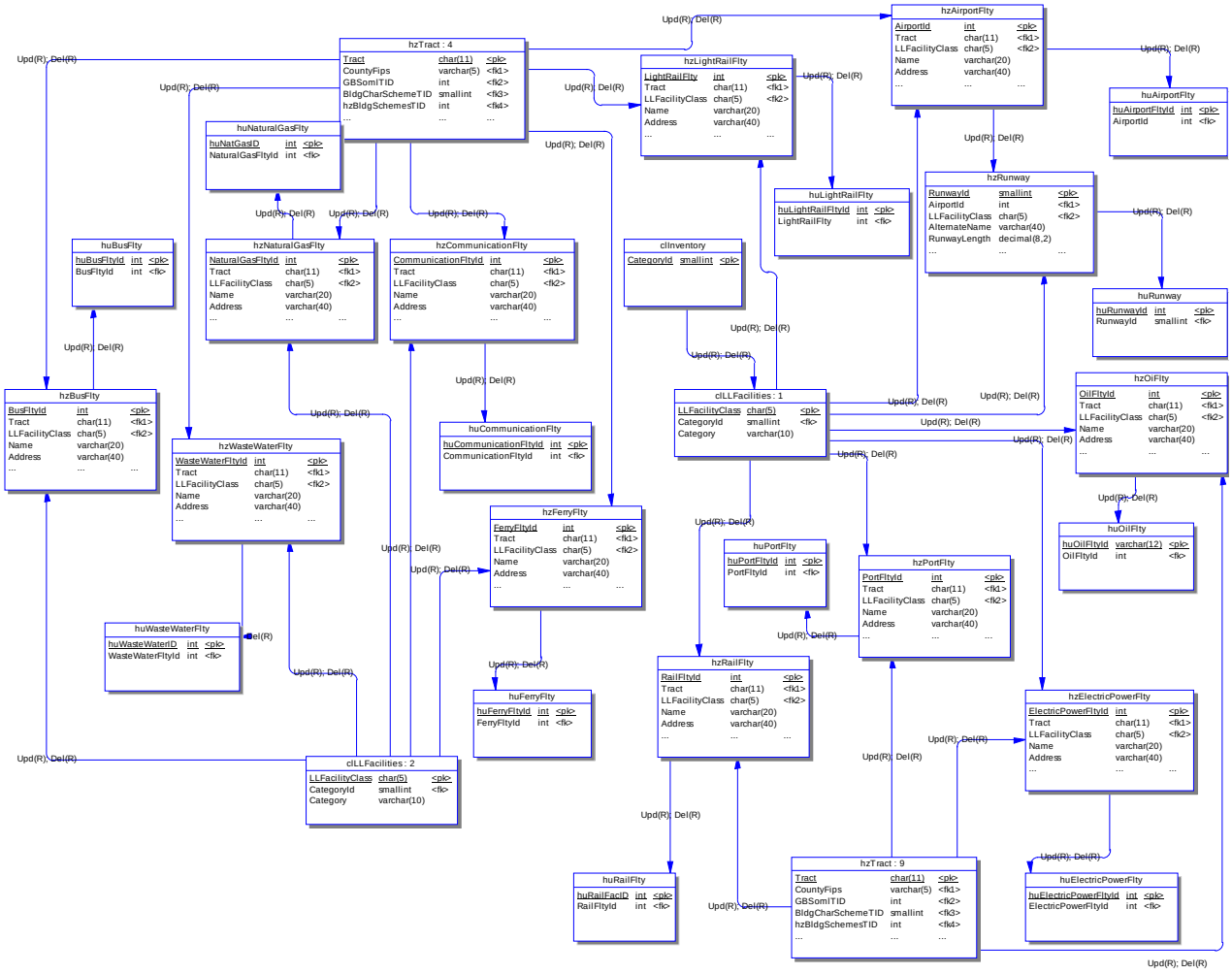

Figure 47. Lifelines Facilities Tables

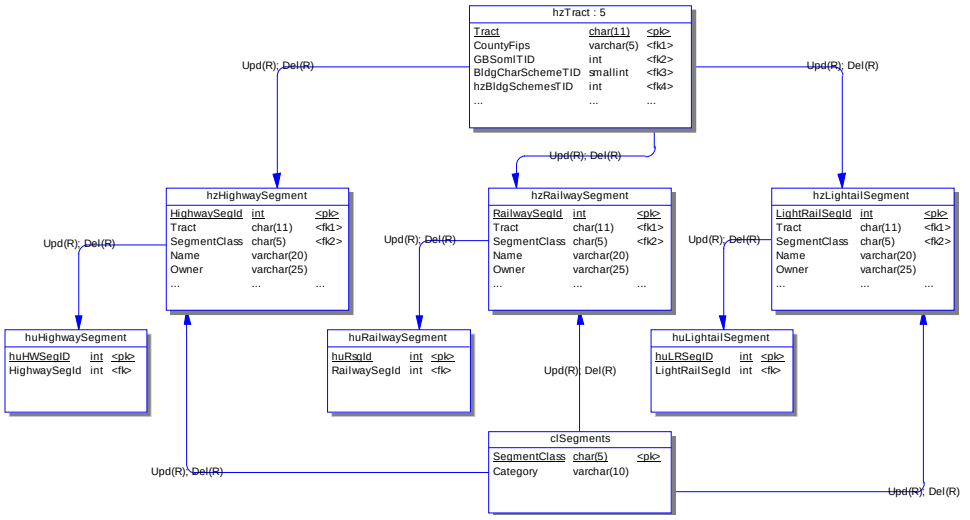

Figure 48. Lifeline Segments Tables

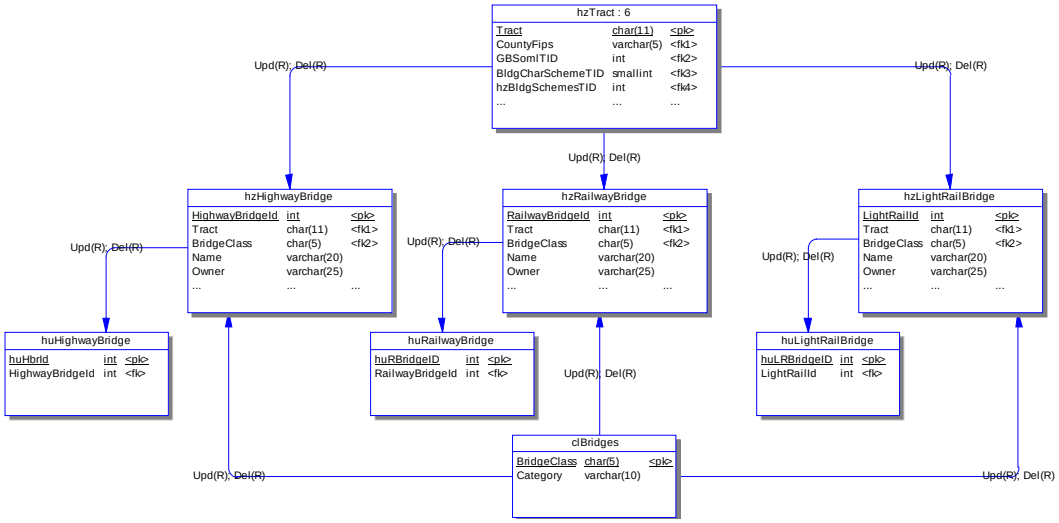

Figure 49. Lifeline Bridges Table

The PDM designs for the Shelter Requirements, Economic Loss Analysis Parameters, and Tree Parameters tables are shown in Figure 50, Figure 51, and Figure 52, respectively. The methodologies and data models for Shelter Requirements and Economic Loss Analysis are very similar to the methodologies and data models implemented in HAZUS99.

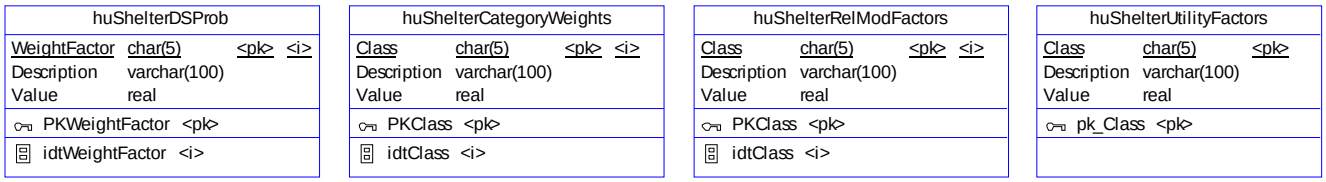

Figure 50. Shelter Parameters Tables

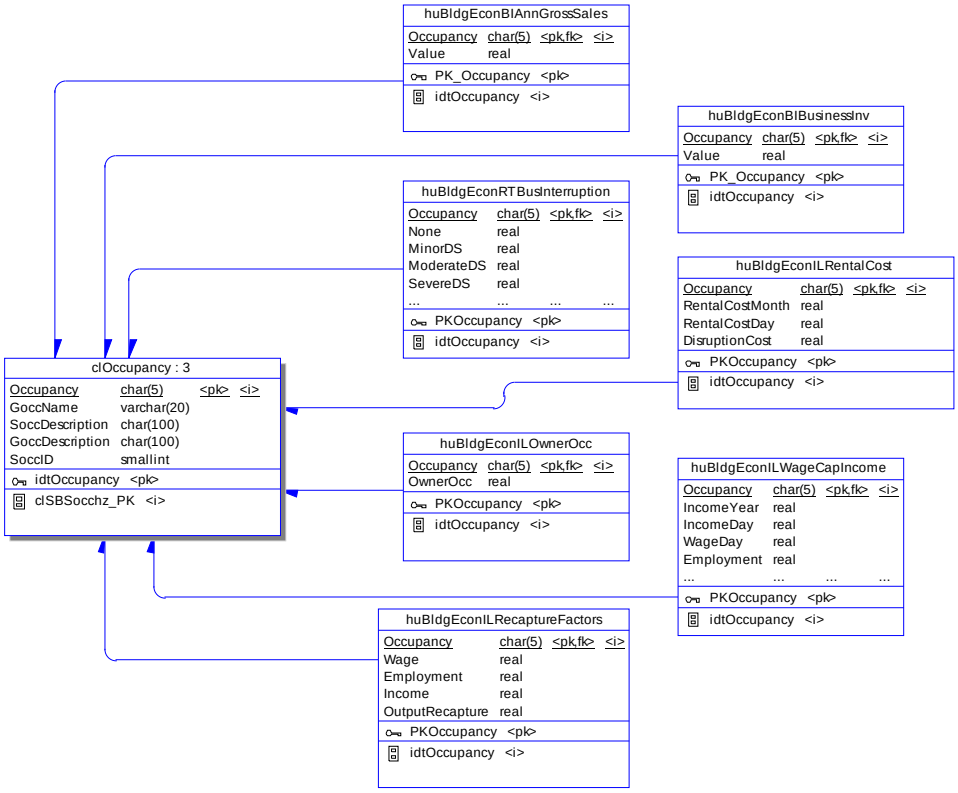

Figure 51. Economic Loss Parameters Tables

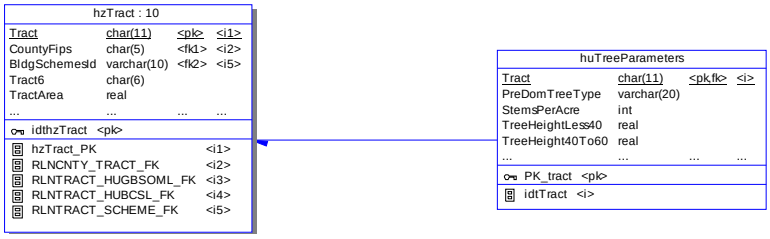

Figure 52. Tree Parameters Tables

Figure 53 shows the PDM design for the Hurricane Terrain table. Each census tract has a single surface roughness. The huTerrain table is indexed by a TerrainID and a Tract.

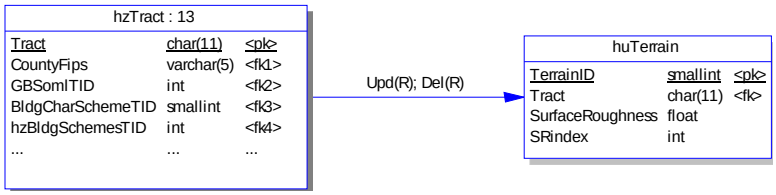

Figure 53. Hurricane Terrain Table

General building stock analysis results are stored in the tables shown in Figure 54. Each census tract has many general building types, specific building types and occupancy classes. The results are stored by census tract, by building or occupancy, and by return period.

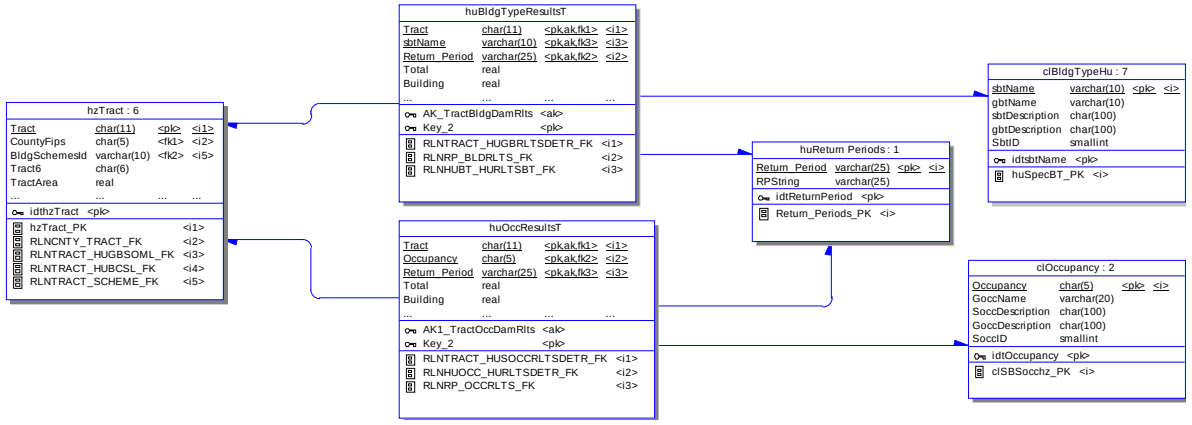

Figure 54. General Building Stock Results Tables

The PDM designs for the Shelter and Debris Results tables are shown in Figure 55. The results saved by census tract and return period.

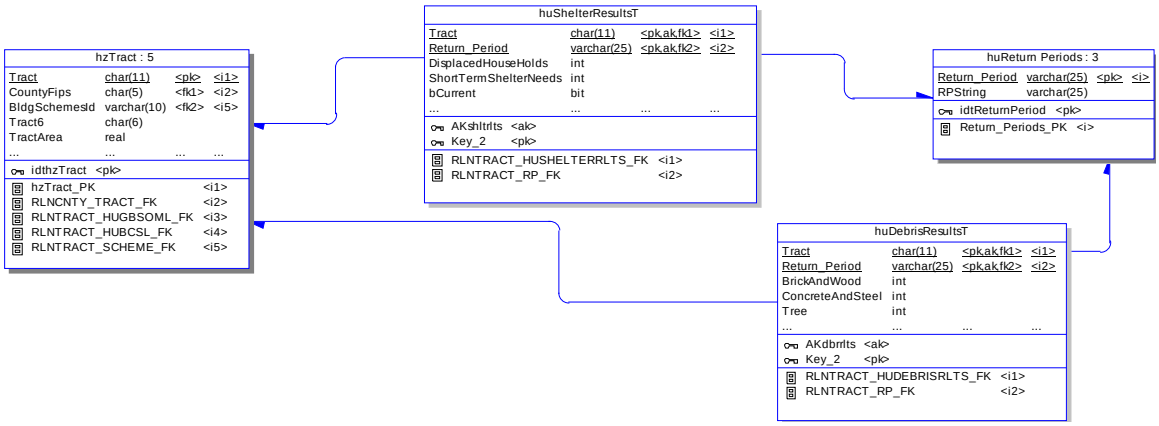

Figure 55. Debris and Shelter Results Tables

The results for essential facilities and user-defined facilities are also stored by return period. The PDM designs for these tables were shown in Figure 56 and in Figure 57.

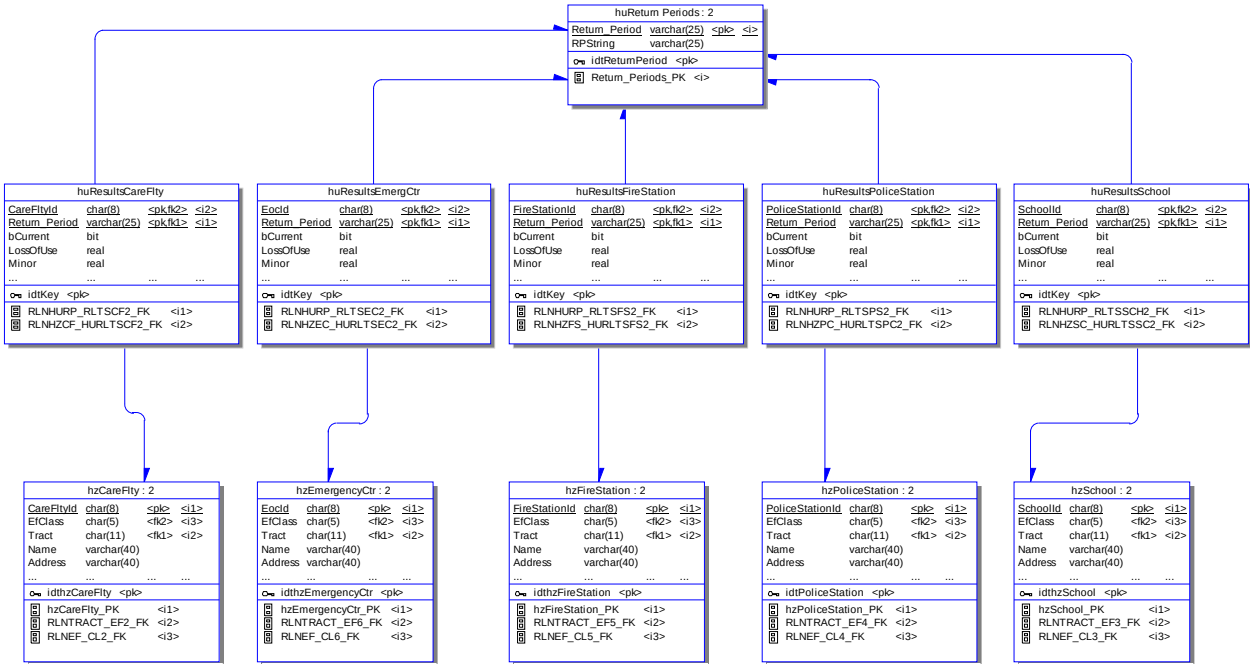

Figure 56. Essential Facilities Results Tables

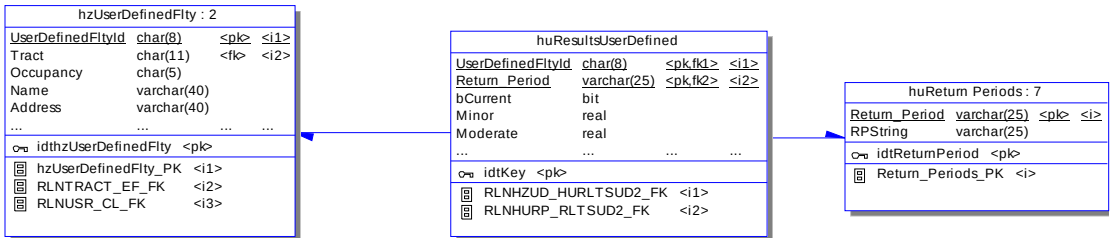

Figure 57. User Defined Facilities Result Tables

All results tables have the scenario name and a bCurrent flag that indicates if the results are current. The flag is set to true after an analysis is complete and is set to false if a part of the analysis was not run or if the analysis data has changed.

3.1.1.2.2.2 Template Views

The Template Database uses views to display its data. Table 8 through Table 17 list the hurricane-specific template views used by the HM.

Table 8. General Building Stock Views

Item Number	View Name	Description
1	hv_huCountGBT	Count by General Building Type
2	hv_huCountGocc	Count by General Occupancy
3	hv_huCountSBT	Count by Specific Building Type
4	hv_huCountSocc	Count by Specific Occupancy
5	hv_huExposureContentGbtT	Exposure Content by General Building Type
6	hv_huExposureContentGoccT	Exposure Content by General Occupancy
7	hv_huExposureContentSbtT	Exposure Content by Specific Building Type
8	hv_huExposureContentSoccT	Exposure Content by Specific Occupancy
9	hv_huExposureGBT	Exposure by General Building Type
10	hv_huExposureGocc	Exposure by General Occupancy
11	hv_huExposureSBT	Exposure by Specific Building Type
12	hv_huExposureSocc	Exposure by Specific Occupancy
13	hv_huExposureTotalGbtT	Total Exposure by General Building Type
14	hv_huExposureTotalGoccT	Total Exposure by General Occupancy
15	hv_huExposureTotalSbtT	Total Exposure by Specific Building Type
16	hv_huExposureTotalSoccT	Total Exposure by Specific Occupancy
17	hv_huSQFGbtT	Square Footage by General Building Type
18	hv_huSQFGoccT	Square Footage by General Occupancy
19	hv_huSQFSbtT	Square Footage by Specific Building Type
20	hv_huSQFSoccT	Square Footage by Specific Occupancy
21	hv_huTractByOccBySQF	Square Footage by Occupancy by Tract
22	hv_huTractExposurebyBldgType	Exposure by Building Type by Tract
23	hv_huTractExposurebyOccupancy	Exposure by Occupancy by Tract

Table 9. Geographical Views

Item Number	View Name	Description
1	hv_huBlock	Census Block Data
2	hv_huTract	Census Tract Data
3	hv_huCountyFips	County Data
4	hv_huCountyList	List of Counties
5	hv_huStates	State Data
6	hv_huSQFbyCnty	Square Footage by County
7	hv_huSqfbyState	Square Footage by State
8	hv_huTractAndLatLong	Tract and Latitude/Longitude Data
9	hv_huTractTerrainInfo	Terrain Info by Tract
10	hv_huTerrain	Terrain by Tract

Table 10. Classification Views

Item Number	View Name	Description
1	hv_huClassificationSBT	Specific and General Building Types
2	hv_huClassificationSocc	Specific and General Occupancy Types
3	hv_huClassificationEF	Essential Facility Types

Table 11. Mapping Scheme Views

Item Number	View Name	Description
1	hv_huBldgCharMapping	Hurricane Wind Building Characteristics Mapping
2	hv_huBldgMappingList	List of Hurricane Mapping Scheme Names
3	hv_huBldgChar	Hurricane Wind Characteristics
4	hv_huBldgCharList	Hurricane Wind Characteristics List
5	hv_huBldgCharWtDistribution	Hurricane Wind Characteristics Distribution
6	hv_huBldgMappingListBlock	Hurricane Mapping Scheme List by Block
7	hv_huBldgMappingListTract	Hurricane Mapping Scheme List by Tract
8	hv_huGBToccMapping	General Occupancy Mapping Schemes Data
9	hv_huGBToccMappingList	List of General Occupancy Schemes
10	hv_huGBToccMappingListBlock	List of General Occupancy Schemes by Block
11	hv_huGBToccMappingListTract	List of General Occupancy Schemes by Tract
12	hv_huOccMapping	Specific Occupancy Schemes
13	hv_huOccMappingCensusBlock	Occupancy Mapping Schemes by Block
14	hv_huOccMappingGoccByBlock	General Occupancy Mapping Schemes by Block
15	hv_huOccMappingGoccByTract	General Occupancy Mapping Schemes by Tract
16	hv_huOccMappingSoccByBlock	Specific Occupancy Schemes by Block
17	hv_huOccMappingSoccByTract	Specific Occupancy Schemes by Tract
18	hv_huSBTOccMapping	Specific Occupancy Mapping Schemes Data
19	hv_huSBToccMappingList	Specific Occupancy Mapping Scheme List
20	hv_huSBToccMappingListBlock	Specific Occupancy Mapping Scheme List by Block
21	hv_huSBToccMappingListTract	Specific Occupancy Mapping Scheme List by Tract
22	hv_huATractByhzOccMapping	General Occupancy Mapping Schemes by Tract
23	hv_huATractByhzOccMappingCensusBlock	General Occupancy Mapping Schemes by Block

Table 12. Essential and User Define Facilities Views

Item Number	View Name	Description
1	hv_huEFInvCareFacilities	Medical Care Facility Inventory Data
2	hv_huEFInvEmergCenter	Emergency Center Inventory Data
3	hv_huEFInvFireStation	Fire Station Inventory Data
4	hv_huEFInvPoliceStation	Police Station Inventory Data
5	hv_huEFInvSchools	School Inventory Data
6	hv_huInvUserDefinedFlty	User Defined Inventory Data

Table 13. Hurricane Scenario and Wind Speed Views

Item Number	View Name	Description
1	hv_huScenarioData	Deterministic Scenario Data
2	hv_huStormTractData	Deterministic Storm Track Data
3	hv_huDeterminsticWindSpeedResults	Deterministic Wind Speed Results
4	hv_huDetermWindSpeedResultsByTimeStep	Deterministic Wind Speed Results by Time Step
5	hv_huMaxPeakGust	Deterministic Max Peak Gust Wind Speed
6	hv_huHistoricWindSpeedT	Historic Wind Speeds from System Database
7	hv_huHwmdWindSpeedT	HWND Wind Speeds from System Database
8	hv_huProbWindSpeeds	Probabilistic Wind Speeds

Table 14. Analysis Function Views

Item Number	View Name	Description
1	hv_huDamageFunctionsBySBT	Damage Functions from System Database
2	hv_huLossFunctionsBySBT	Loss Functions from System Database
3	hv_huDebrisFunctionsBySBT	Debris Functions from System Database
4	hv_huRestorationFunctionsBySBT	Restoration Functions from System Database

Table 15. General Building Stock Results Views

Item Number	View Name	Description
1	hv_huResultsBldgDamT	Damage Results by Building Type
2	hv_huResultsBldgLossT	Loss Results by Building Type
3	hv_huResultsBldgEconOutAndEmpGocT	Building Economic Loss Results
4	hv_huBldgRelatedLossRlts	Building Related Loss Results
5	hv_huResultsOccDamT	Damage Results by Occupancy
6	hv_huResultsOccLossT	Loss Results by Occupancy
7	hv_huSummaryDamage	Damage Summary
8	hv_huSummaryDamageBldgType	Damage Summary by Building Type
9	hv_huSummaryDamageOcc	Damage Summary by Occupancy
10	hv_huSummaryLossBldgType	Loss Summary by Building Type
11	hv_huSummaryLossOcc	Loss Summary by Occupancy

Table 16. Essential Facilities Results Views

Item Number	View Name	Description
1	hv_huResultsEfDamageCareFlty	Care Facility Results
2	hv_huResultsEfDamagePoliceStation	Police Station Damage Results
3	hv_huResultsEfDamageEmrgCtr	Emergency Center Damage Results
4	hv_huResultsEfDamageSchool	School Facilities Damage Results
5	hv_huResultsEfDamageFireStation	Fire Station Damage Results
6	hv_huResultsUserDefinedDamage	User Defined Damage Results

Table 17. Shelter and Debris Results Views

Item Number	View Name	Description
1	hv_huResultsDebrisT	Debris Results by Tract and Block
2	hv_huResultsShelterT	Shelter Results by Tract and Block

3.1.1.2.2.3 Template Stored Procedures and Triggers

The Template Database also uses stored procedures. Table 18 lists the hurricane-specific stored procedures used by the hurricane model. Triggers are not being used by the hurricane model.

Table 18. Hurricane Model Stored Procedures (SP) and Triggers (T)

Item Number	Name	SP	T	Description
1	hp_huPophuBldgCharWt_Table	√		Uses the huListOfBldgChar table and the huBldgCharValidity table and populates and initialize the huBldgCharWt with zero.
2	hp_huPopHuBldgMappingTable	√		Populates the huBldgMapping table using the huBldgCharValidity table, the huListOfBldgChar table.
3	hp_huUpdateDistribution	√		Calculates the total wind building type distribution using the huBldgMapping table and the ListOfWindBldgTypes Table and then populates the huBldgCharWt table with the results.
4	hp_huResultsCurrentStatus	√		Sets bCurrent to False in general building stock and general occupancy results tables.
5	hp_huMappingSchemeEF	√		
6	hp_huUpdateEF	√		Updates HU Essential Facility table when the HZ table is updated.
7	hp_huUpdateUD	√		Updates HU User Defined Facility table when the HZ table is updated.
8	hp_huRollUpResultsData	√		Rolls Results from the specific building/occupancy to general.
9	hp_huDeleteResults	√		Delete data in results tables.
10	hp_huCopyTables	√		Used by the DTS packages to copy data from the template table to the study region table.
11	hp_huCreateMapView	√		Used to create views used by the Mapping Engine.
12	hp_huDeleteInTable	√		Delete data from a table.
13	hp_huTemplate	√		Used by DTS Package to copy data from the Microsoft Access Database to the Template Database.
14	hp_huTemplateCB	√		Populates the Census Block Tables from the Census Tract tables.
15	hp_huTemplateEF	√		Populates the HU Essential Facilities table using the HZ tables.
16	hp_huTemplateTract	√		Populates the HU Tract tables from the HZ Tract tables.

3.1.1.3 Data Dictionary

The Data Dictionary in Appendix B lists all of the tables and columns in the HM database. The data dictionary is divided into the system and template databases. Each database has a list of tables and a list of columns. The list of tables has the database table name, its primary key, and description of the table. The list of columns has the table name, the name of the column, the data type, and a description.

3.1.1.4 Data Services Package

The Data Services package, shown in Figure 58, consists of five COM components, namely, *hudInventory*[1], *hudHazard, hudAnalysis, hudResults*, and *hudRegion* (Table 19). Each of these components consists of COM objects that retrieve and update data from the underlying SQL database. The COM objects communicate with the database through the Microsoft ActiveX Data Objects layer (MS ADO).

[1] Naming Convention for COM components: The first two letters define the hazard; “hu” stands for hurricane. The third letter defines the layer to which the COM component belongs: “d” = Data layer, “a” = Application layer, and “p” = Presentation layer.

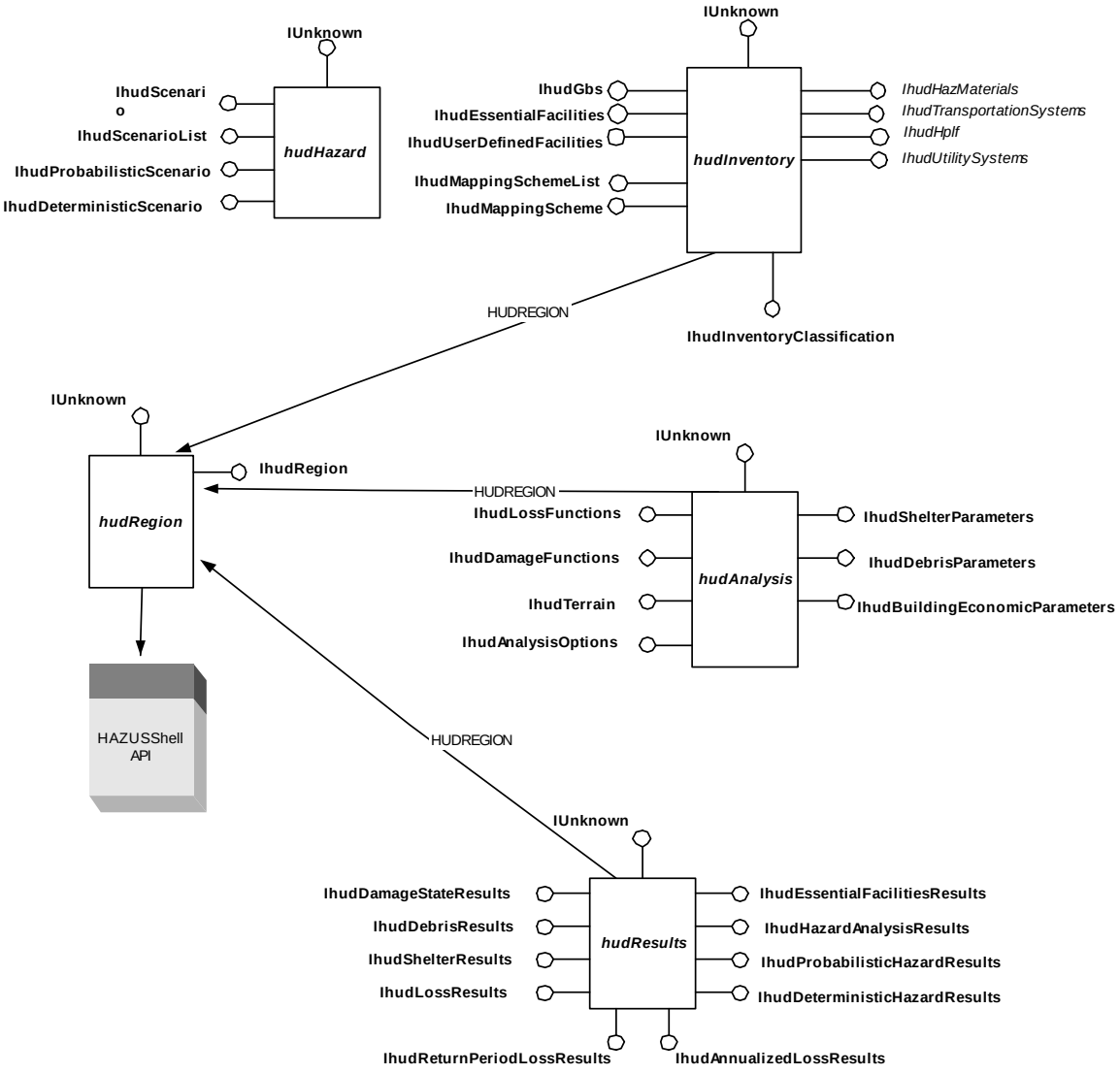

Figure 58. Component Diagram for the Data Services Package[2]

[2] See Figure 1, Section 1.4.1, for diagram legend.

Table 19. Data Services Package Component List

Component Name	Description
hudRegion	Accesses the study region definitions and properties through the HAZUS shell API
hudInventory	Inventory Data
hudHazard	Hurricane Storm Data
hudAnalysis	Analysis Parameters
hudResults	Analysis Results

3.1.1.4.1 Study Region Component Design Description

The Study Region component accesses the current study region definitions, and properties through the HAZUS Shell API. Figure 59 shows the class diagram for the *hudRegion* data access component.

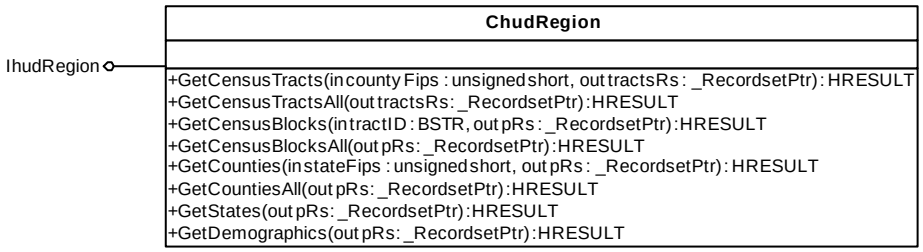

Figure 59. Class Diagram for the Study Region Component

The coclass *ChudRegion* implements the following methods that are published through the *IhudRegion* interface:

- *GetCensusTract*: Retrieves the census tracts in the current region that belong to a county. The ADO Recordset object is populated with the census tract FIPS.

- *GetCensusTractAll*: Retrieves all the census tracts in the current region. The ADO Recordset object is populated with the census tract FIPS.

- *GetCensusBlock*: Retrieves the census blocks in the current region that belong to a census tract. The ADO Recordset object is populated with the census block FIPS.

- *GetCensusBlockAll*: Retrieves all the census blocks in the current region. The ADO Recordset object is populated with the census block FIPS.

- *GetCounties*: Retrieves the counties in the current region that belong to a state. The ADO Recordset object is populated with the county FIPS.

- *GetCountiesAll*: Retrieves all the counties in the current region. The ADO Recordset object is populated with the county FIPS.

- *GetStates*: Retrieves all the states in the current region. The ADO Recordset object is populated with the state FIPS.

- *GetDemographics*: Retrieves the demographic data by census tract or census block for the current study region. This method is called by the *hudInventory* component's *IhudDemographic* interface to retrieve demographic inventory data for the region.

3.1.1.4.2 Inventory Component Design Description

The Inventory component classes provide access to the inventory data. The HM provides the following inventory specific data:

- General Building Stock
  - Square footage distribution by census tract (or census block) for each occupancy class
  - Building count by census tract (or census block) for each occupancy class and specific building type
  - Dollar exposure by census tract (or census block) for each occupancy class and specific building type
  - Occupancy mapping by General and Specific Building Types for each census tract (or census block)
  - Valuation Parameters
  - Wind building characteristics mapping schemes for each census tract (or census block)

- Essential Facilities

  - Schools
  - Emergency Response Centers
  - Medical Care Centers
  - Police Stations
  - Fire Stations

- User-Defined Facilities
- *High-potential Loss Facilities (HPLF)*[3]
- *Transportation Systems*
- *Utility Systems*
- *Hazardous Materials*
- Demographics

Figure 60 shows the *hudInventory* class diagrams. Every class in the *hudInventory* component has an association with the *ChudDataConnection* class via the *IhudDataConnection* interface. When the HM application is first started, a valid connection is established with the underlying RDBMS through the Microsoft Database Engine (MSDE). If the connection to the database is lost or corrupted during the lifetime of the application, the data services objects shall be responsible for re-establishing and verifying a valid connection. Thus, every object has an instance of the *ChudDataConnection* class.

[3] Italicized items in this list can be only be viewed and mapped in the current version of the Hurricane Model. Implementation classes for these interfaces are not shown in Figure 60.

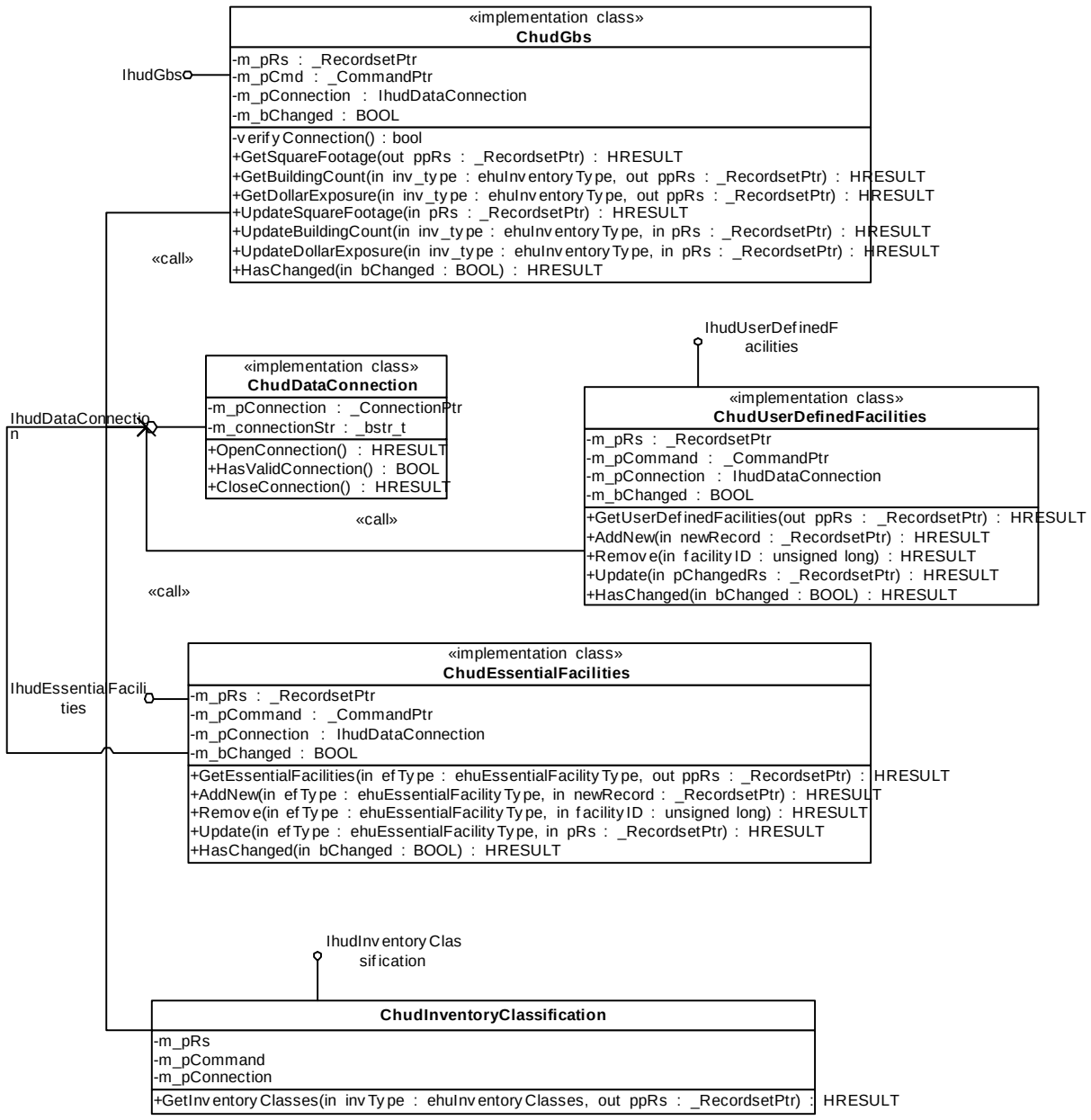

Figure 60. Class Diagram for the Inventory Component

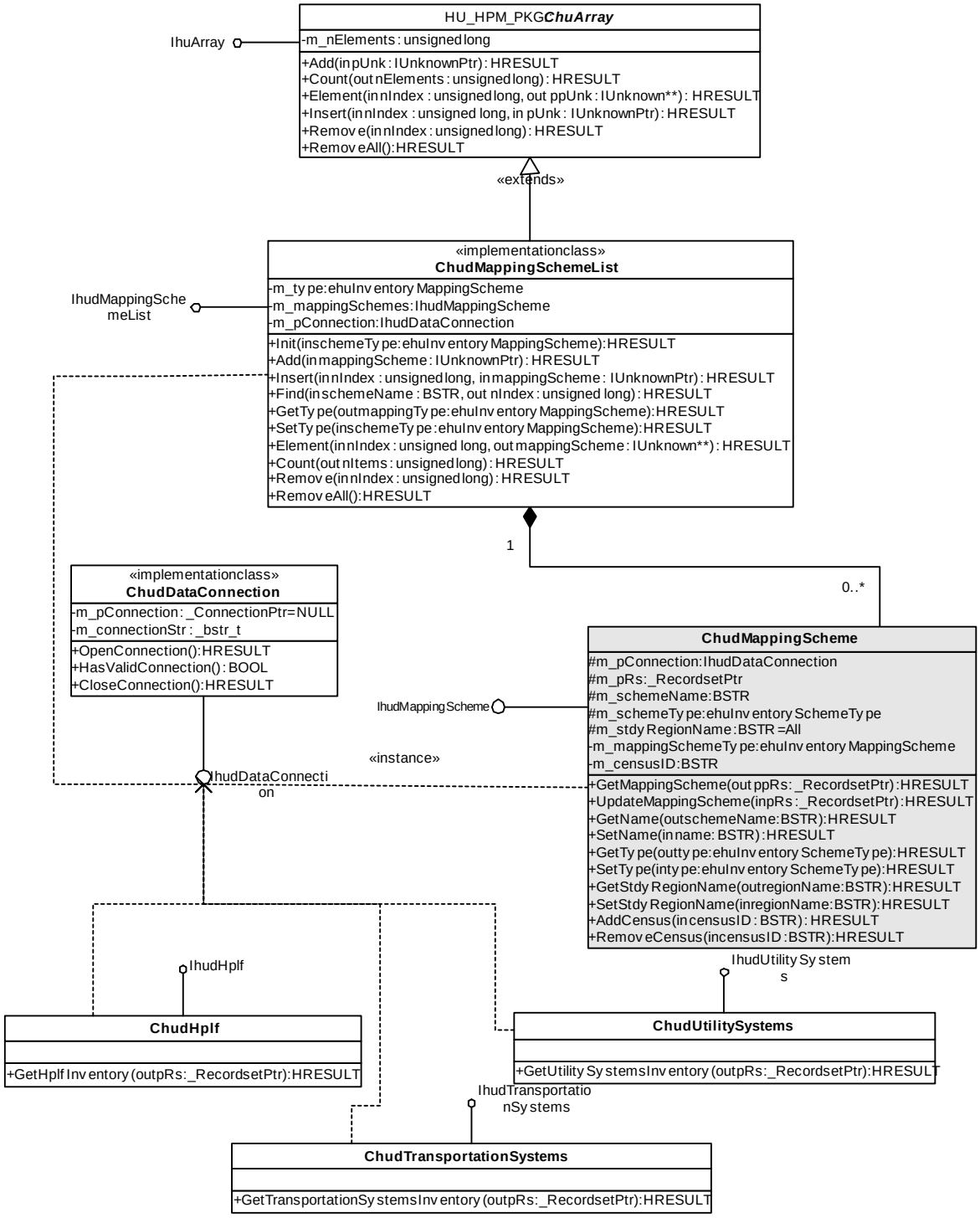

Figure 60. Class Diagram for the Inventory Component (continued)

The continuation of Figure 60 shows an <<*extends*>> relationship between the *ChudMappingSchemesList* and *ChuArray* class. The *ChuArray* class is a generalized abstract collection class and belongs to the HU_HM_PKG. The HU_HM_PKG has global scope and can be used by any of the HM components. The “extends” relationship is a *type inheritance* relationship, thus, all the methods and properties in *ChuArray* are shared with *ChudMappingSchemesList*. The *ChudMappingSchemesList* is a collection of *ChudMappingScheme* objects. A particular study region could have one or more mapping schemes, thus, the relationship is a 1..* composition relationship. The *ChudMappingSchemesList* is a *coclass* and *ChudMappingScheme* is a *class*. The objects of type *ChudMappingScheme* are created by objects of type *ChudMappingSchemesList.* Table 20 and Table 21 list the classes and interfaces for the Inventory component.

Table 20. List of Classes for the Inventory Component

Name	Visibility	Abstract	Inherits
ChudEssentialFacilities	Public	FALSE	None
ChudUserDefinedFacilities	Public	FALSE	None
ChudInventoryClassification	Public	FALSE	None
ChudMappingSchemeList	Public	FALSE	ChuArray
ChudMappingScheme	Public	FALSE	None
ChudGbs	Public	FALSE	None
ChudDemographics	Public	FALSE	None
ChudHPLFacilities	Public	FALSE	None
ChudUtilityFacilities	Public	FALSE	None
ChudTransportationFacilities	Public	FALSE	None
ChudHazmat	Public	FALSE	None

Table 21. List of Interfaces for the Inventory Component

Name	Visibility	Abstract
IhudEssentialFacilities	Public	FALSE
IhudUserDefinedFacilities	Public	FALSE
IhudInventoryClassification	Public	FALSE
IhudMappingSchemeList	Public	FALSE
IhudMappingScheme	Public	FALSE
IhudGbs	Public	FALSE
IhudDemographics	Public	FALSE
IhudHPLFacilities	Public	FALSE
IhudHazmat	Public	FALSE
IhudTransportationFacilities	Public	FALSE
IhudUtilityFacilities	Public	FALSE
IhudDataConnection	Public	FALSE

3.1.1.4.3 Hazard Component Design Description

The Hazard component is designed to retrieve and update the hazard scenario database. As shown in Figure 61, the classes in the Hazard component inherit from the *ChudScenario* class. Each scenario object must be either probabilistic or deterministic. Table 22 and Table 23 list the classes and interfaces for the Hazard component.

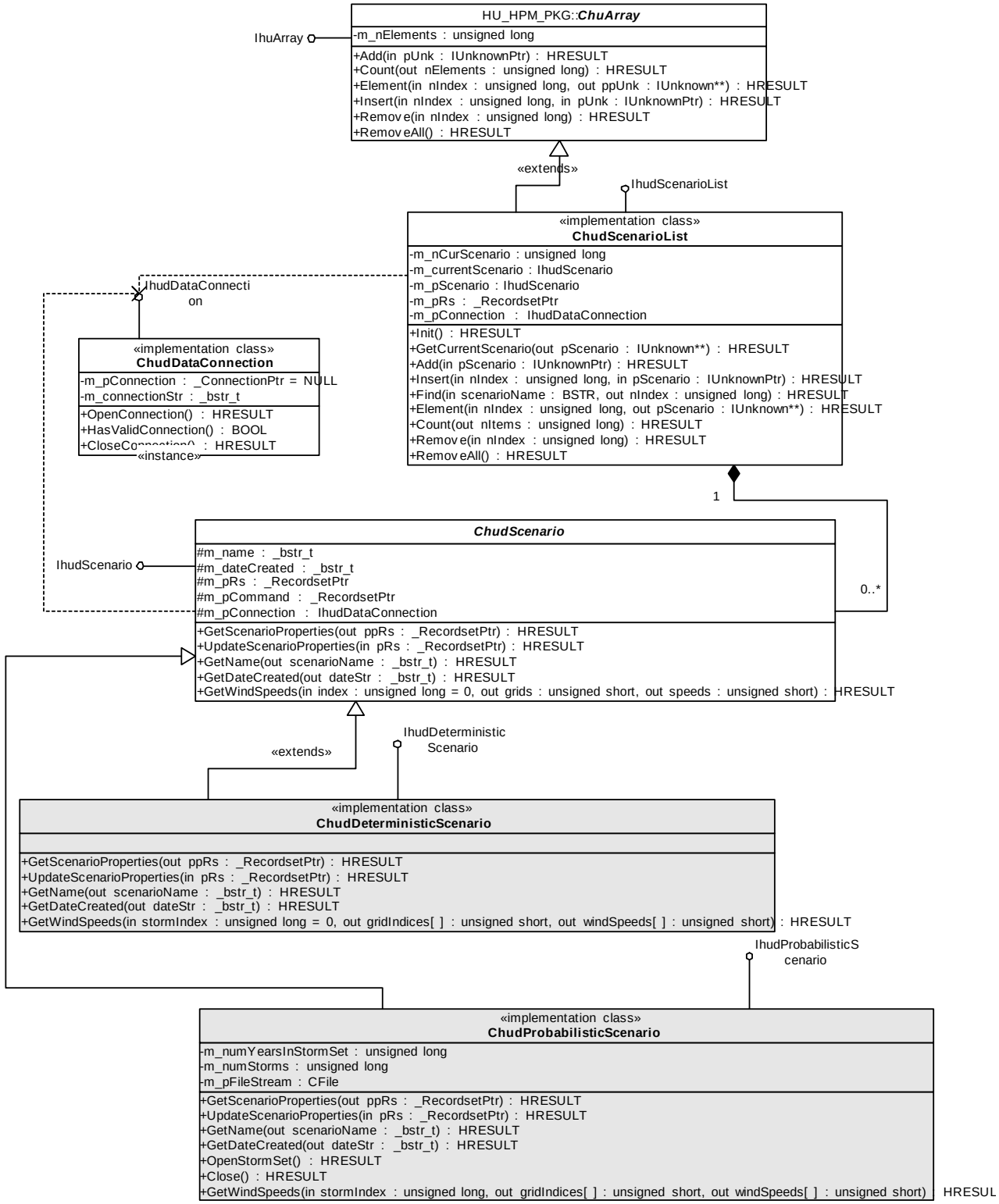

Figure 61. Class Diagram for the Hazard Component

Table 22. List of Classes for the Hazard Component

Name	Visibility	Abstract
ChudScenarioList	Public	FALSE
ChudScenario	Public	TRUE
ChudProbabilisticScenario	Public	FALSE
ChudDeterministicScenario	Public	FALSE
ChudHistoricScenario (not shown in Figure 61*)*	Public	FALSE

Table 23. List of Interfaces for the Hazard Component

Name	Visibility	Abstract
IhudScenarioList	Public	FALSE
IhudScenario	Public	TRUE
IhudProbabilisticScenario	Public	FALSE
IhudDeterminsiticScenario	Public	FALSE
IhudHistoricScenario (not shown in Figure 61*)*	Public	FALSE

A collection of *ChudScenario* objects is stored in a *ChudScenarioList* object. The *ChudScenarioList* object stores additional information such as the current active scenario, total number of scenarios, and the current scenario index. The *ChudScenarioList* class inherits from the *ChuArray* abstract class.

The *ChudScenario* class is an abstract base class for *ChudProbabilisticScenario* and *ChudDeterminsiticScenario* classes. Each scenario has a name, a unique identifier, date on which it was created and other storm specific properties. These properties can be accessed individually through *"Get"* and *"Set"* methods or can be combined and retrieved as an ADO Recordset object.

The probabilistic scenario class (*ChudProbabilisticScenario*) accesses a binary file that stores wind speeds by census tract for 100,000 years of simulated storms. The *CFile* data member stores a pointer to the binary file stream that is used to access the storm file. Each *ChudProbabilisticScenario* object also stores the binary file header information (i.e., number of storms in the file and total number of years). The *GetWindSpeeds* method returns the peak wind speeds and census tract grid indices based on the storm index. The deterministic scenario data are accessed through the *ChudDeterministicScenario* class. Each deterministic scenario has a

storm track and storm track properties associated with it. The storm track is composed of two or more points. Each point object in a deterministic storm track will have the following properties:

- Elapsed Time (hrs)
- Latitude (degrees)
- Longitude (degrees)
- Maximum wind speed (mph)
- Radius to maximum wind speeds (km)
- Translation Speed (m/s)
- Profile parameter
- Central pressure (mBar)

The *ChudDeterministicScenario* object uses the *GetScenarioProperties* method to retrieve the scenario properties as an ADO Recordset object. The *UpdateScenarioProperties* method is used to modify a scenario in the database or add a new scenario and its properties to the database.

3.1.1.4.4 Analysis Parameters Component Design Description

The Analysis Parameters component is designed to access data that are used in the damage and loss calculations (Figure 62). The classes shown in Table 24 access damage and loss functions, terrain, economic parameters such as cost modifiers by region, shelter parameters, debris parameters, and analysis options. The interfaces to the *IhudAnalysis* component are listed in Table 25.

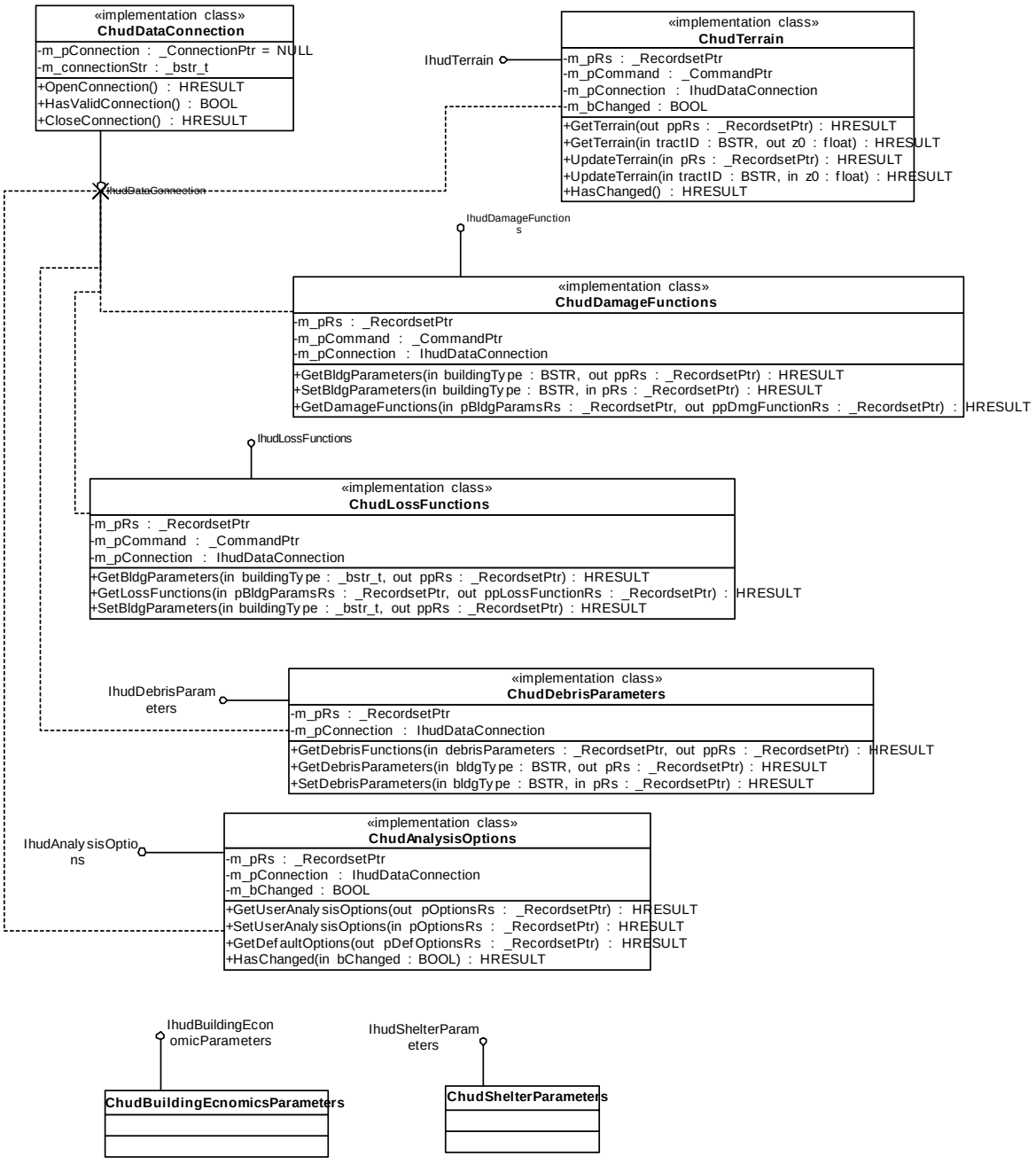

Figure 62. Class Diagram for the Analysis Parameters Data Services Class

Table 24. List of Classes for the Analysis Parameters Component

Name	Visibility	Abstract
ChudBuildingsEconomic	Public	FALSE
ChudDamageFunctions	Public	FALSE
ChudLossFunctions	Public	FALSE
ChudTerrain	Public	FALSE
ChudDebrisParameters	Public	FALSE
ChudShelterParameters	Public	FALSE
ChudAnalysisOptions	Public	FALSE
ChudAnalysisFunctions	Public	FALSE
ChudTreeBlowdownFunctions (not shown in Figure 62*)*	Public	FALSE
ChudTreeBlowdownParameters (not shown in Figure 62*)*	Public	FALSE
ChudOutputOptions (not shown in Figure 62*)*	Public	FALSE

Table 25. List of Interfaces for the Analysis Parameters Component

Name	Visibility	Abstract
IhudBuildingsEconomic	Public	FALSE
IhudDamageFunctions	Public	FALSE
IhudLossFunctions	Public	FALSE
IhudTerrain	Public	FALSE
IhudDebrisParameters	Public	FALSE
IhudShelterParameters	Public	FALSE
IhudAnalysisOptions	Public	FALSE
IhudAnalysisFunctions	Public	FALSE
IhudTreeBlowdownFunctions (not shown in Figure 62*)*	Public	FALSE
IhudTreeBlowdownParameters (not shown in Figure 62*)*	Public	FALSE
IhudOutputOptions (not shown in Figure 62*)*	Public	FALSE

The *ChudDamageFunctions* and *ChudLossFunctions* access the loss and damage functions. The loss and damage functions depend on the building type and characteristics. In order to retrieve the appropriate functions the building type and characteristics have to be defined. The *GetBuildingProperties* and *SetBuildingProperties* methods are used to retrieve and define the building characteristics. The *GetLossFunctions* and *GetDamageFunctions* retrieve the appropriate loss or damage curve.

The debris functions are accessed through the *ChudDebrisParameters* class. The underlying debris functions are very similar to the damage and loss functions. As a result, the class definition for *ChudDebrisParameters* is very similar to damage and loss function classes.

The terrain data are accessed through the *ChudTerrain* class. The *GetTerrain* and *UpdateTerrain* methods can be used to retrieve the surface roughness lengths for the whole study region (by census tract) as an ADO Recordset object or for individual census tracts as floats.

3.1.1.4.5 Results Component Design Description

The Results component, shown in Figure 63, is designed to populate the results database tables and retrieve data from these tables when requested by the user. The results database will be populated based on the study region and hazard scenario used to run the analysis. The class and interface lists for the Results component are provided in Table 26 and Table 27, respectively.

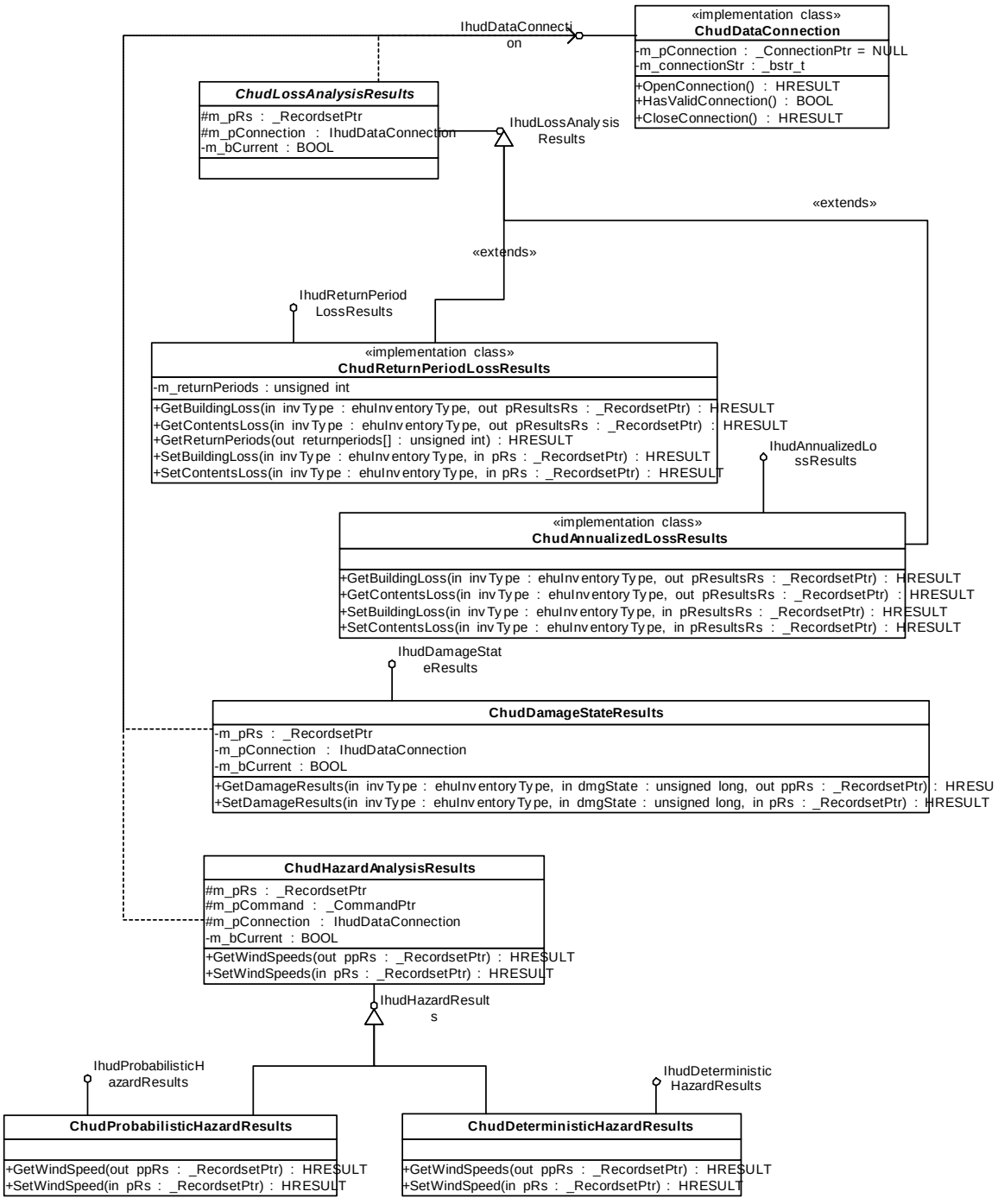

Figure 63. Class Diagram for the Results Component

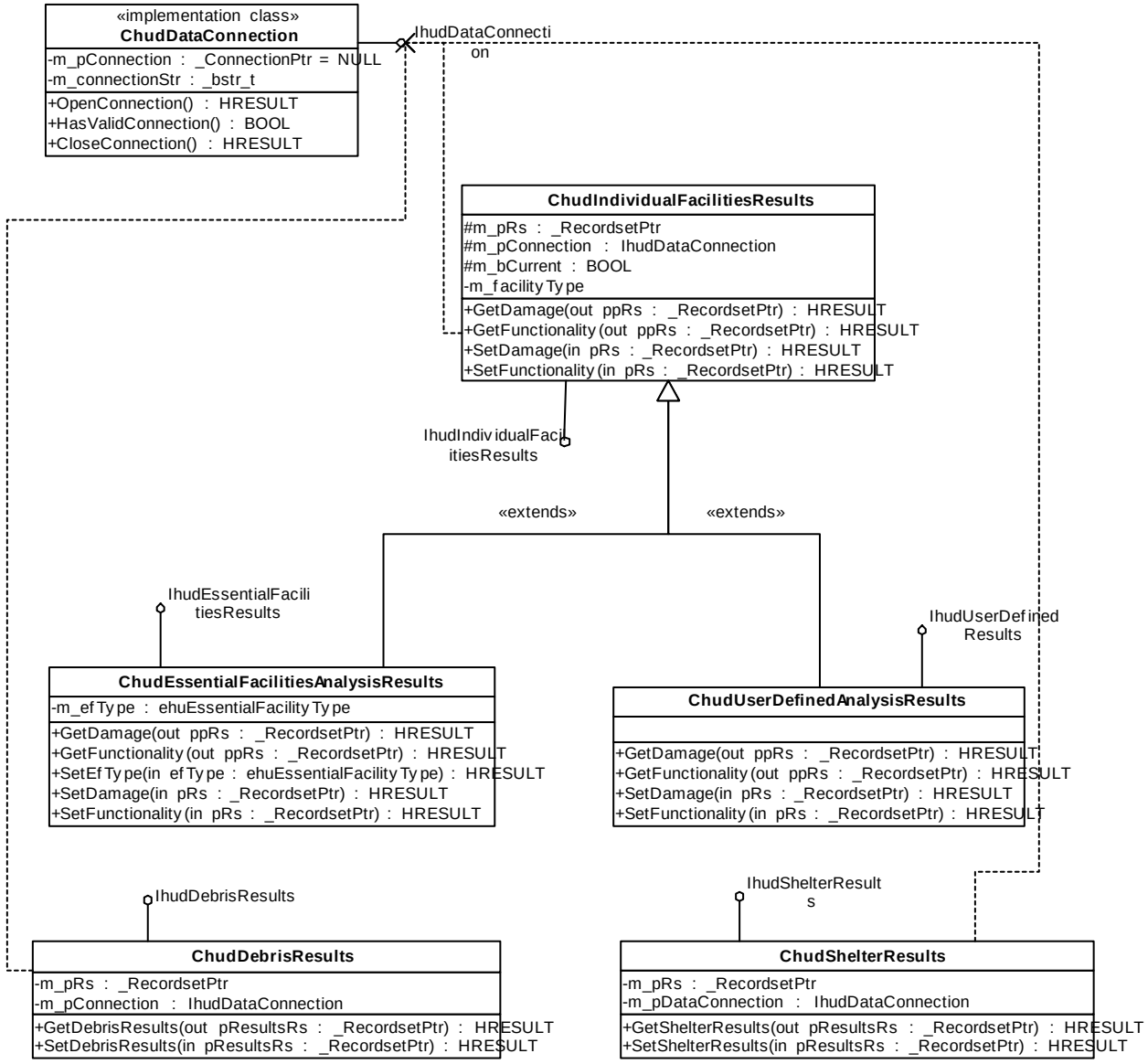

Figure 63. Class Diagram for the Results Component (continued)

Table 26. List of Classes for the Results Component

Name	Visibility	Abstract
ChudDebrisResults	Public	FALSE
ChudShelterResults	Public	FALSE
ChudDamageStateResults	Public	FALSE
ChudLossResults	Public	TRUE
ChudIndividualFacilitiesResults	Public	TRUE
ChudUserDefinedFacilitiesResults	Public	FALSE
ChudEssentialFacilitiesResults	Public	FALSE
ChudAnnualizedLossResults	Public	FALSE
ChudReturnPeriodLossResults	Public	FALSE
ChudHazardAnalysisResults	Public	TRUE
ChudProbabilisticHazardResults	Public	FALSE
ChudDeterministicHazardResults	Public	FALSE
ChudRapidLossResults (not shown in Figure 63*)*	Public	FALSE
ChudRollUpResults (not shown in Figure 63*)*	Public	FALSE
ChudSaveResults (not shown in Figure 63*)*	Public	FALSE
ChudSummaryResults (not shown in Figure 63*)*	Public	FALSE
ChudSummaryReports (not shown in Figure 63*)*	Public	FALSE

Table 27. List of Interfaces for the Results Component

Name	Visibility	Abstract
IhudDebrisResults	Public	FALSE
IhudShelterResults	Public	FALSE
IhudDamageStateResults	Public	FALSE
IhudAnalysisLossResults	Public	TRUE
IhudIndividualFacilitiesResults	Public	TRUE
IhudUserDefinedFacilitiesResults	Public	FALSE
IhudEssentialFacilitiesResults	Public	FALSE
IhudAnnualizedLossResults	Public	FALSE
IhudReturnPeriodLossResults	Public	FALSE
IhudHazardAnalysisResults	Public	TRUE
IhudProbabilisticHazardResults	Public	FALSE
IhudDeterministicHazardResults	Public	FALSE
IhudRapidLossResults (not shown in Figure 63*)*	Public	FALSE
IhudRollUpResults (not shown in Figure 63*)*	Public	FALSE
IhudSaveResults (not shown in Figure 63*)*	Public	FALSE
IhudSummaryResults (not shown in Figure 63*)*	Public	FALSE
IhudSummaryReports (not shown in Figure 63*)*	Public	FALSE

The *ChudLossResults* class stores the probabilistic or deterministic scenario analysis results. The probabilistic results are of two types: losses by return periods and average annual losses. The *ChudReturnPeriodLosssResults* class *and ChudAnnualizedAnalysisResults* class are used to access the probabilistic analysis results. To access the deterministic analysis results, the *ChudAnnualizedLossResults* class is used. Both of these classes inherit from *ChudLossResults*.

ChudDamageStateResults class is used to access general building stock damage state results. The damage state results are classified into four damage-state categories: minor, moderate, severe, and complete.

The hurricane hazard scenario results are accessed through the *ChudHazardAnalysisResults* class. The *ChudProbabilisticHazardResults* class and the *ChudDeterministicHazardResults* class inherit from the *ChudHazardAnalysisResults* abstract base class. The *GetWindSpeeds* method in the *ChudProbabilisticHazardResults* class returns the peak gust and one-minute sustained wind speeds by census tract for each return period (the return periods are selected by the user while setting up the analysis options). The *GetWindSpeeds* method in the *ChudDeterministicHazardResults* class returns the peak gust and one-minute sustained wind speeds by census tract for the deterministic storm used in the analysis.

The essential facilities results are classified into damage and functionality. The *GetDamage* and *SetDamage* methods in *ChudEssentialFacilitiesAnalysisResults* class retrieve and save the damage state results for each facility. The *GetFunctionality* and *SetFunctionality* methods retrieve and save the *loss of use* results for each facility in the current study region. Similar methods are implemented in the *ChudUserDefinedAnalysis Results* class, except that loss of use is not calculated in the HM for user-defined facilities.

Each results object also has a *BOOLEAN* (true or false) data member. This member is set to true if the inventory data, scenario, and results are all current. If the inventory and/or the scenario are changed after the analysis is run, the results are no longer current and this data member is set to false.

3.1.2 Application Layer Design

The Application layer is divided into two packages: the Calculation Engine package and the Work Flow package. The following sections describe the Application layer design for the HM.

3.1.2.1 Calculation Engine Package

The Calculation Engine package, shown in Figure 64, consists of the Analysis Engine component (*huaAnalysisEngine*) and the Wind Field component (*huaWindField*). The Analysis Engine is designed to carry out the hurricane-specific analyses (loss, damage, debris, and shelter) and is invoked by the analysis module in the Work Flow layer. The Wind Field component computes the wind speeds by census tracts due to a deterministic storm.

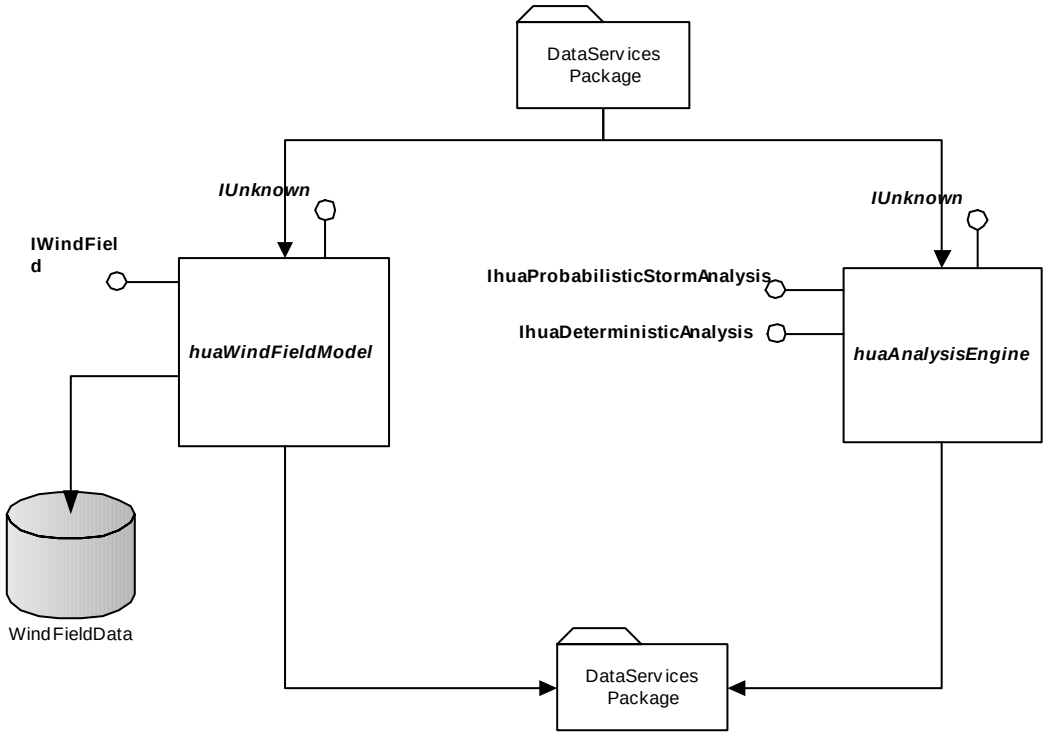

Figure 64. Component Diagram for the Calculation Engine Package

3.1.2.1.1 Wind Field Model Component Design Description

The Hurricane Scenario wizard is used to define a hurricane storm scenario. In this wizard, the user has a choice to run a probabilistic or deterministic storm scenario. A probabilistic storm uses pre-defined wind speeds from a large set of simulated storms. These wind speeds are defined as a peak gust wind speed in flat, open terrain at the centroid of each census tract. The HM goes on to use these wind speeds to calculate the final loss and damage results.

Wind speeds for probabilistic storm scenarios are not stored in the database, but are stored in binary files found for each State on the State Data DVDs. The wind speeds are stored for several return periods and indexed by census tract and storm scenario ID.

Deterministic storm scenarios do not have pre-defined wind speeds. Instead, the peak gust and one-minute sustained wind speeds must be calculated for each census track in the study region based on storm track and intensity parameters specified by the user. The Wind Field component is used for calculating these wind speeds.

3.1.2.1.1.1 General Design

The Wind Field component is written as a FORTRAN DLL with the aid of Digital Fortran's "Fortran Com Server Wizard." The wizard creates support files needed to create the COM component and creates the framework for the interfaces and methods. Some of the generated code was edited to allow the creation of dynamically allocated arrays. Storm track and census tract data are sent to the COM component in the form of SAFE ARRAYS. The use of safe arrays allows the component to be used by clients written in different languages (FORTRAN, C++, VB, etc.).

3.1.2.1.1.2 Wind Field Model Interfaces

The interface to the Wind Field component is *IWindfield*. This interface provides access to the different services available to the Hurricane Model. The services and results provided by the Wind Field component depend on the format of the storm track data input by the user. For example, when defining a deterministic scenario, the user must choose between defining the elapsed time at each point along the storm track or the translation speed at each point along the storm track. In the latter case, the translation speeds are used to calculate the time required for the storm to travel from point to point along the storm track.

3.1.2.1.1.3 Wind Field Model Methods

3.1.2.1.1.3.1 Set File Path

Many of the subroutines in the Wind Field model require support files. The *Set_FilePath* method specifies the location of these support files (*cFilePath*).

3.1.2.1.1.3.2 Set Number of Storm Points

The *Set_nPoints* method is used to input the number of storm points (*nPoints*) into the Wind Field model. Two or more points are required to define a storm track. Many of the other methods loop on storm points.

3.1.2.1.1.3.3 Set Number of Census Tracts

The *Set_nTract* method is similar to the *Set_nPoints* method. It inputs the number of census tracts (*nTract*) in the study region to the Wind Field model. Peak gusts and sustained wind speeds are computed at the centroid of each census tract.

3.1.2.1.1.3.4 Set Flag

The *Set_Flag* method is used to input a flag (*bflag*) into the Wind Field model. The flag is used to determine if the time steps of the storm track have to be calculated. The flag should be set to TRUE if the user inputs the translation speed for each point of the storm track. The Wind Field model then calculates the elapsed time at each point along the track.

The flag should be set to FALSE if the user has entered the elapsed time at each point along the track so the translation speed for each point can be calculated.

3.1.2.1.1.3.5 Set Latitude and Longitude

The main purpose of the *Set_LatLong* method, shown in Figure 65, is to convert the latitude and longitude coordinates to an X/Y coordinate system. The inputs to this method are the latitudes and longitudes of the storm track points (*Storm_Lat, Storm_Long*) and the locations of the centroids of each census tract (*Cen_Lat, Cen_Long*) in the study region.

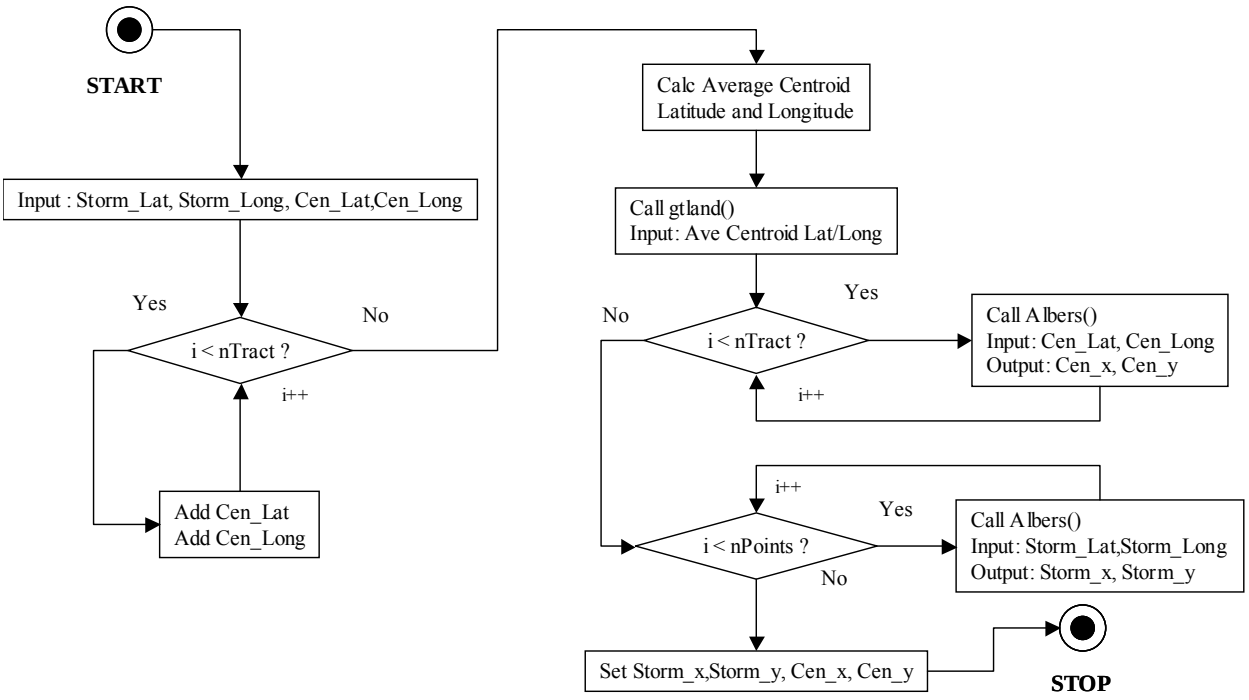

Figure 65. Set Latitude and Longitude Diagram

Once the latitude and longitude data are sent to the Wind Field model, the average latitude and longitude of all the census tract centroids are calculated. These values are input to the subroutine *gtland*. The subroutine *gtland* initializes the Albers Projection by calling the *Albers* subroutine. Once initialized, control is returned to the *Set_LatLong* method.

Next, *Set_LatLong* loops through the census tracts calling the *Albers* method each time. Albers returns the X/Y coordinates for each centroid.

The same is done for each of the storm track points. Albers returns the X/Y coordinates for each point. Once returned, the X/Y coordinates are set in the Wind Field model.

3.1.2.1.1.3.6 Set Time

There are two paths for setting the elapsed time (*Storm_Time*) at each point along the storm track. Both are done by the *Set_Time* method, shown in Figure 66. The *bflag* flag determines if the time between storm track points needs to be set in the Wind Field model or if the time needs to be calculated and then set. If the *bflag* is FALSE, then the time between points was given by

the user and the time does not have to be calculated. In this instance, the time is set by looping though the number of storm points setting each point in the Wind Field model.

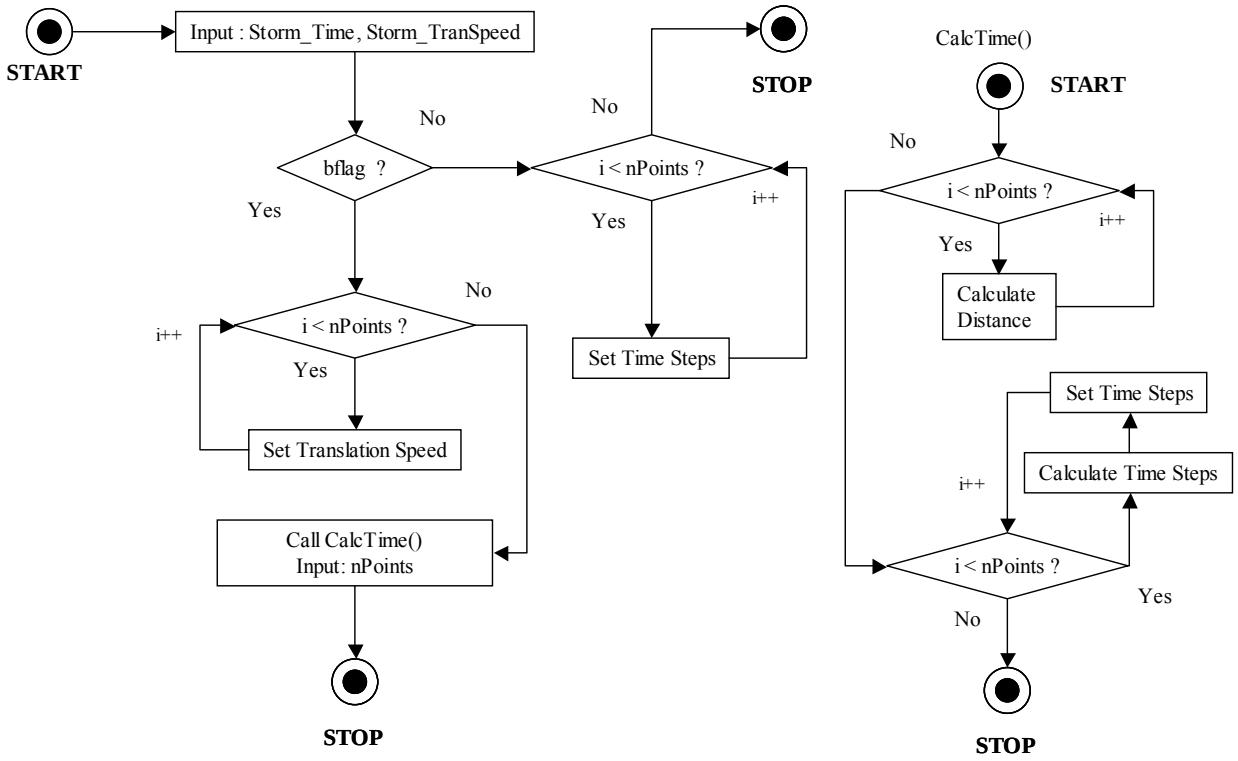

Figure 66. Set Time Diagram

If the *bflag* is equal to TRUE, then the time between points has to be calculated prior to setting the values in the Wind Field model. The translation speed is used to calculate the time between points.

The first step in calculating the time is to set the translation speed for each storm track point into the Wind Field model. Once all the speeds are set, the *CalcTime* subroutine is called. The input for the subroutine is the number of storm track points. A loop is used to calculate the distance between each point. Once the distance is calculated, another loop uses the distance and the translation speed to calculate the time steps. The loop also sets the time step for each point into the Wind Field model. When that loop is complete, control is returned to the client.

3.1.2.1.1.3.7 Translation Speeds

The Translation_Speeds method is shown in Figure 67. This diagram shows how the translation speed (*TranSpeed*) is calculated for each point along the storm track. The calculations begin by inputting the number of storm track points into the *CalcTransSpeed* subroutine. The *CalcTransSpeed* subroutine is called within the *Translation_Speeds* method.

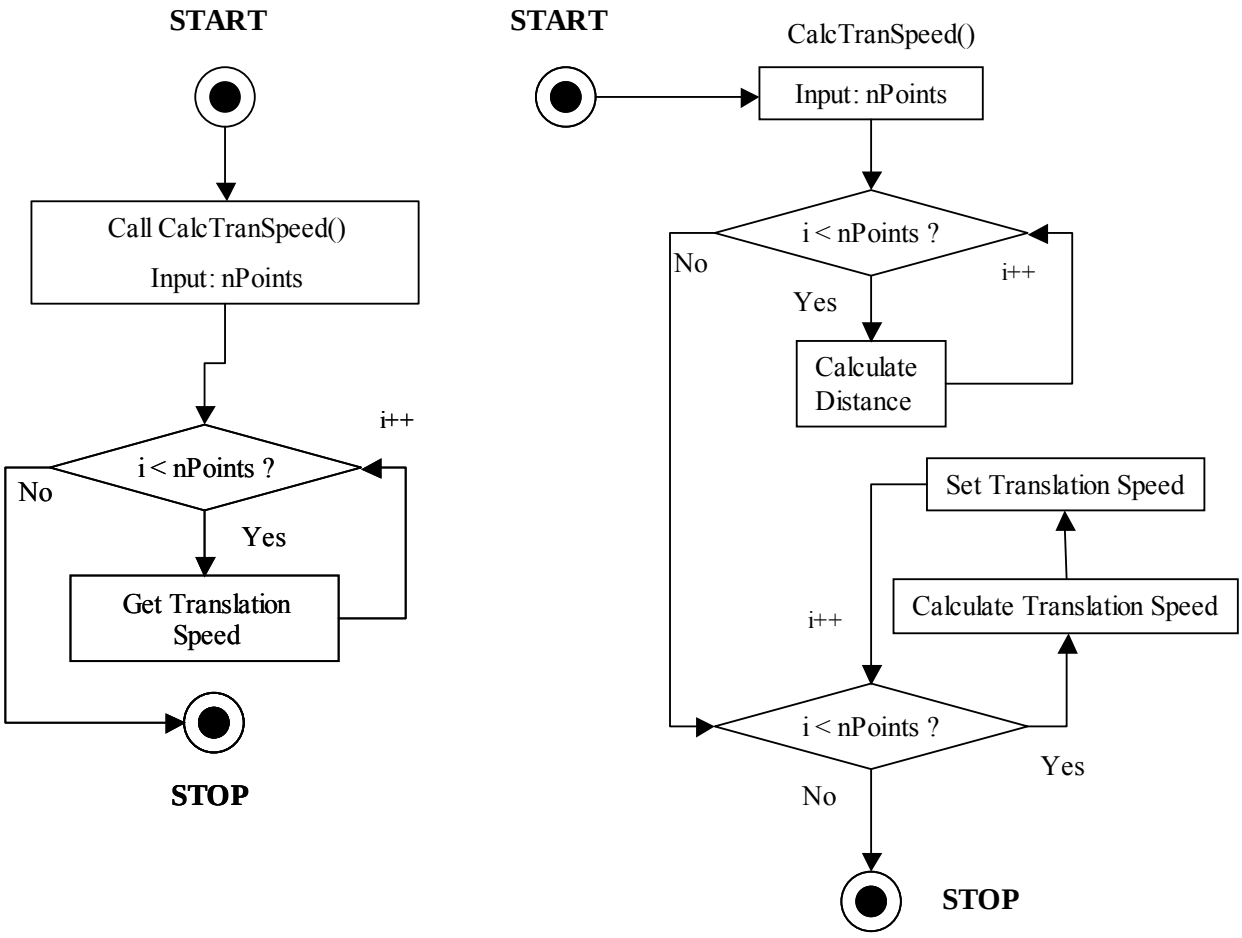

Figure 67. Translation Speeds Diagram

The *CalcTransSpeed* subroutine first determines the distance between the two storm points. Once complete, it uses the distance and the time between the points to calculate the translation speed at each storm track point. In the same loop, the translation speed is set within the Wind Field model. The *CalcTransSpeed* subroutine ends when all the translation speeds for the storm points are calculated and set within the Wind Field model.

Control is returned to the *TransSpeed* method. The translation speed is returned to the client by means of the *Storm_TranSpeed* array. The translation speed set in the Wind Field model is copied to the *Storm_TranSpeed* array and then returned to the client.

3.1.2.1.1.3.8 Calculate Wind Speeds

The CalcWindSpeeds method is shown in Figure 68. The input data for this method are listed below:

- Central pressure (∆P)
- Profile parameter (B)
- Radius to maximum winds (Rmax)
- Distance between the census tract centroid and the coast of the study region

Other inputs should have been set by their appropriate methods. These items are listed below:

- Number of census tracts
- Number of storm points
- Translation speed (C)
- The time between storm points
- The distance between storm points

The method begins by calculating the heading for each storm track point. This is done by calling the *CalcHeading* subroutine. The input for the subroutine is the number of points in the storm track. A loop is used to cycle through each point. The first step calculates the change in position between each point. Once calculated, these data are used to determine the heading. Each point cycles through calculating the heading and setting the results in the Wind Field model. After the last point is reached, control is sent back to the *CalcWindSpeed* method.

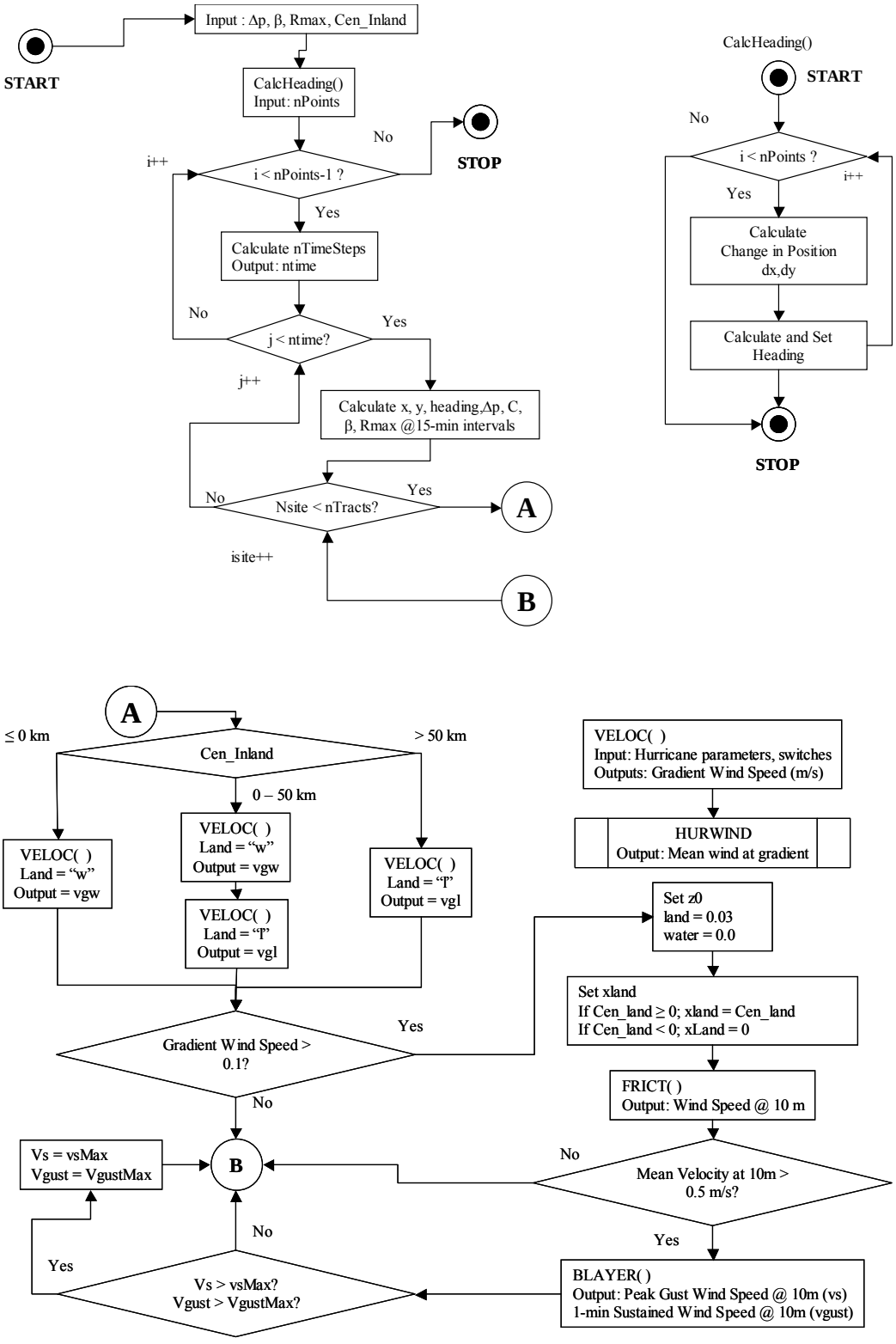

Figure 68. Calculate Wind Speed Diagram

Determining the maximum peak wind speed and the 1-minute sustained wind speed for each census tract requires the distance from the storm track to the location of the centroid of each census tract. Three loops are used to cycle through the number of segments, the number of time steps, and the number of sites or census tracts.

The first loop (i < nPoints – 1) is the outer loop used for the storm segment. The data for each storm segment are determined from the beginning point and ending point of each segment. This loop calculates the number of 15-minute intervals between each point. Once determined, the change in Time, Central Pressure, Rmax, Heading, Translation Speed, X/Y Distance, and the Profile Parameter between the end points of the segment are calculated. These results are used in the time step loop.

The time step loop begins by calculating the storm data at each 15-minute interval after the starting storm track point. This information is applied to each of the census tract centroid locations while looping through the number of census tracts.

The census tract loop is shown in upper half of Figure 68. The subroutine *Veloc* calculates the gradient wind speed at the centroid of the census tract. This subroutine is called once if the storm is over water or more than 50 kilometers inland; however, if the storm is transitioning from water to land, the subroutine is called twice.

Inside the *Veloc* subroutine is another subroutine called *Hurwind*. *Hurwind* is called to calculate the mean wind speed at gradient. The methodology implemented in the Hurwind subroutine is given in Vickery et al. (2000). This mean wind speed at gradient is then used by *Veloc* to calculate the gradient wind speed over land and/or over water.

A filter is used to only process gradient wind speeds greater than 0.1 m/s. Its purpose is to stream line the calculations by filtering out any gradient wind speeds less than 0.1 m/s. If greater than 0.1 m/s, the process proceeds with the next calculation. If it is less than 0.1 m/s, the next census tract location is analyzed.

Once the gradient wind speed over water and/or over land are determined, the z0 or roughness is set to 0.03 for land and 0.0 for water. If *Cen_land* is less than zero, the variable *xland*, the distance inland, is set to zero.

The gradient wind speed and the distance inland are inputs to the *Frict* subroutine. The *Frict* subroutine converts the gradient wind speeds to the mean velocity at 10 meters for each census tract. Only mean velocities greater than 0.5 m/s are retained.

The subroutine *Blayer* is called next. The main input to *Blayer* is the mean velocity at 10 meters, and its outputs are the peak gust wind speed and the 1-minute sustained wind speed for the current census tract and time step.

The next step is to determine if the newly calculated wind speeds are the maximum for the census tract. A peak wind speed and 1-minute sustained wind speed are compared to results calculated earlier in the process. If the results are less, then the loop repeats with a new census tract location. If it is more, then the results are copied to the maximum wind speed variables and then returns to the beginning of the loop for the next census tract location.

At this point, the process diagrammed in Figure 68 repeats for each storm track segment and 15-minute interval until it has reached the last point on the storm track.

3.1.2.1.1.3.9 Get Peak Gust

The *Get_Peak_Gust* method is used to return the maximum peak gust wind speeds (*PeakGust*) for each census tract in the form of a pointer to an array of single precision floating point numbers.

3.1.2.1.1.3.10 Get Sustained Winds

The *Get_Sustained_Wind* method is used to return the maximum 1-minute sustained wind speeds (*SustainedWind*) for each census tract in the form of a pointer to an array of single precision floating point numbers.

3.1.2.1.1.4 Storm Tract Parameters

The storm parameters for each point are populated in a table in the Hurricane Scenario wizard. An example of the table is shown in Figure 69.

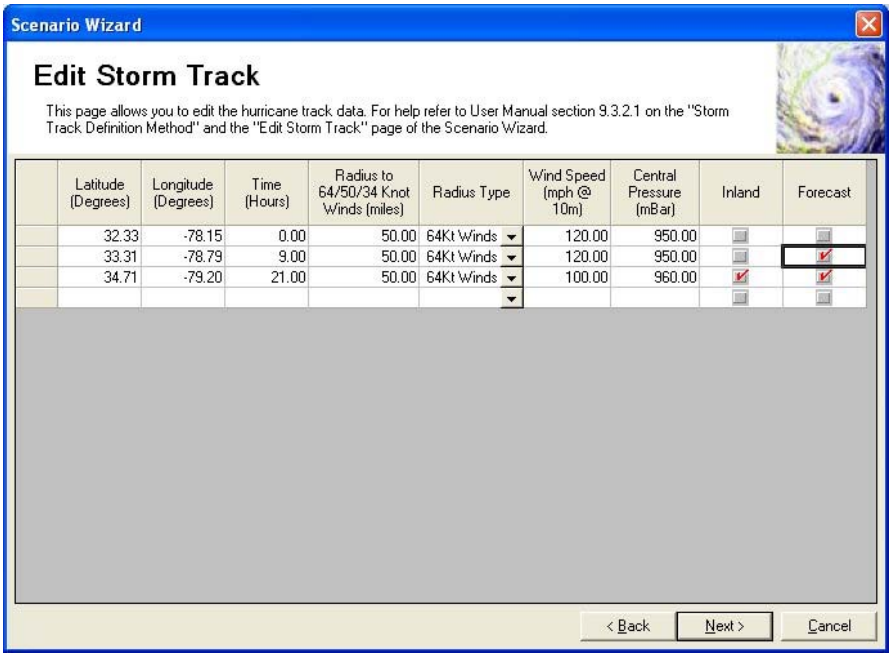

Figure 69. User-Defined Storm Track Table

As noted previously, the user must choose between defining the elapsed time at each point along the storm track or the forward translation speed at each point along the storm track. For the example, in Figure 69 the user has chosen to input the elapsed time. As an result, the translation speed column is hidden. The translation speed will be filled in using the *Translation_Speed* method described in Section 3.1.2.1.1.3.7.

The user must also decide which two of the following three parameters will be entered into the storm track table: “Wind (mph@10m)”, “Central Pressure (mbar)”, and “Profile Parameter”. The Wind Field model provides the services to calculate the third parameter based on the values provided by the user for the other two parameters.

HAZUS provides three methods for defining a storm track. These are: (a) entering the parameters into the Hurricane Scenario Wizard storm track table, (b) using the map tool and plotting the storm track points on a map of the study region, or (c) importing a comma delimited text file. Figure 70 shows an example of a multi-segment storm track crossing Dade County, Florida.

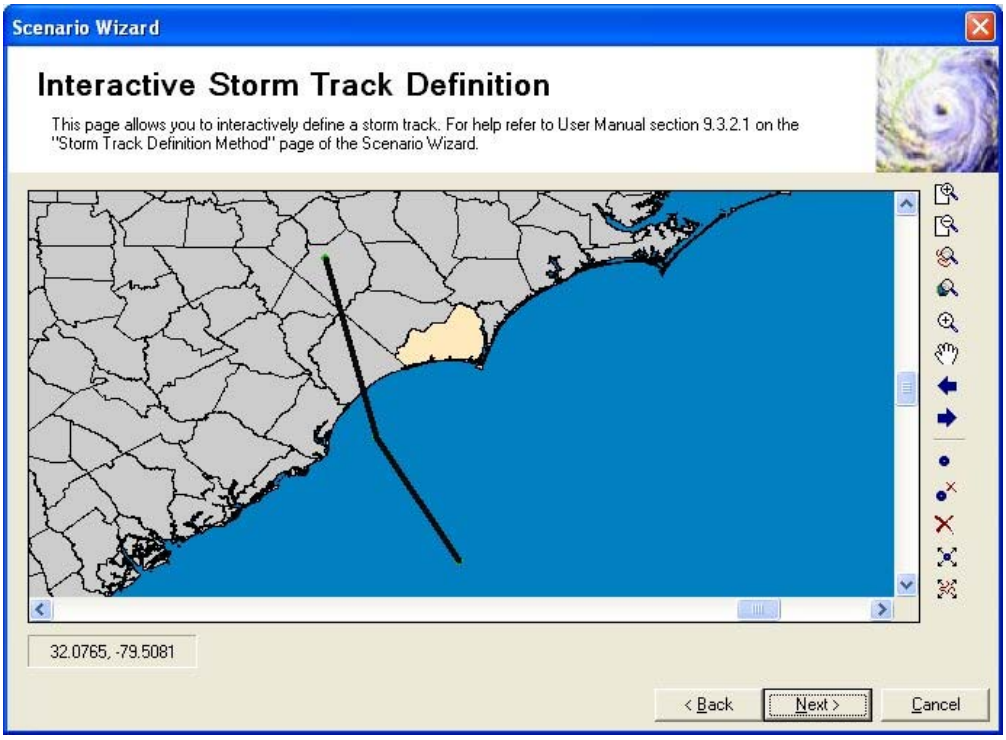

Figure 70. Example of a Multi-Segment Storm Track Map

Thus, the required input parameters are:

- Time (hours) or Translation Speed (m/s)
- Latitude (degrees) and Longitude (degrees) of each point
- Radius to Maximum Winds (km)
- Two of the following: Wind (mph @ 10m), Central Pressure (mbar), or Profile Parameter

and the calculated parameters are:

- Translation Speed (m/s) or Time (hours) – whichever one is not specified by the user
- Wind (maximum sustained 1-minute average over water at a height of 10 meters), Central Pressure (mbar), or Profile Parameter – whichever one is not specified by the user

3.1.2.1.1.5 Calling Sequence

The complete calling sequence for computing the maximum peak gust and 1-minute sustained wind speed for each census tract is shown in Figure 71. This sequence assumes that the central pressure, wind (sustained one-minute average over water in miles per hour at a height of 10 meters) and profile parameters have been provided by the user. Slightly different calling sequences will be required if the user chooses to input different combinations of the optional parameters.

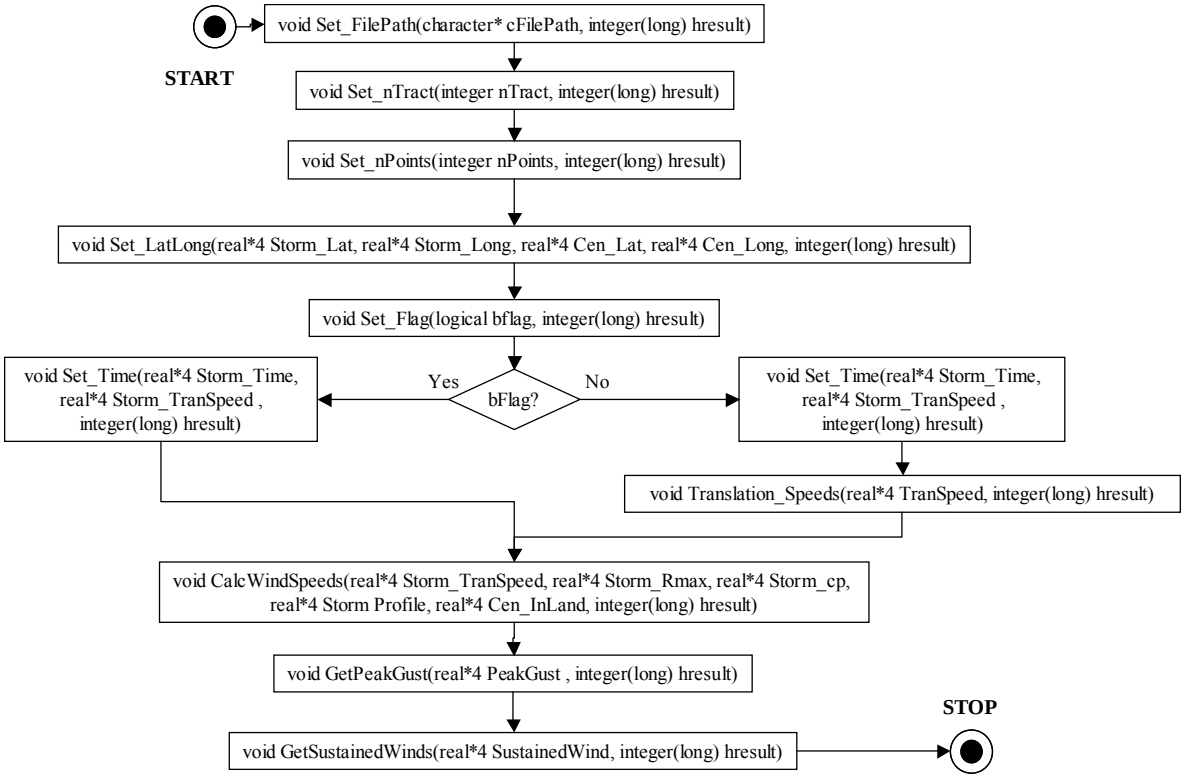

Figure 71. Wind Field Model Calling Sequence

3.1.2.1.2 Analysis Engine Component Design Description

The Analysis Engine component is used to run a probabilistic or deterministic analysis. In order to run an analysis, the *huaAnalysisEngine* component requires the Inventory, Hazard, and Analysis data in a preprocessed format for faster computational time. The preprocessed data are stored in the data services layer before the start of an analysis. Figure 72 shows the class diagram for the Analysis Engine component.

Table 28 and Table 29 list the classes and interfaces for the Analysis Engine component.

The Work Flow Analysis component instantiates the *ChuaProbabilsiticAnalysis* or *ChuaDeterministicAnalysis* class based on the type of the current hazard scenario. Next, it calls the *AggregateAnalysisFuncForGBS*, *AggregateAnalysisFuncForEf*, and *AggregateAnalysisFunc ForUdf* functions to aggregate the analysis functions (Loss, Damage, Loss of Use, and Shelter functions) for the current study region. These functions call the *ChuaAnalysisFunctions* class, which computes and stores the analysis functions based on the mapping scheme, terrain, and analysis function type. Figure 73 shows the flow charts for aggregating the analysis functions by Specific Building Type for the General Building Stock.

The aggregated analysis functions are stored by the function type (loss, damage, debris, or shelter), specific building type, mapping scheme identifier, and terrain. Only the out-of-date analysis functions are recalculated by the computation engine. The aggregated analysis functions for the specific building types are calculated before the aggregated analysis functions for the specific occupancy classes.

The hurricane building characteristics mapping schemes are used to compute the aggregated analysis functions for the specific building types. Once the mapping schemes for the current region are obtained, the loss, damage, debris, and shelter functions are weighted for each specific building type. The functions are stored for each of five standard terrains. The Study Region component is then queried to obtain the census tract (or census blocks) in the current region and terrain data are obtained for each census tract. The analysis functions are then interpolated between the appropriate standard terrains. The analysis functions are stored by a unique combination of mapping scheme identifier and terrain index. Thus, the storage requirements will be determined by the number of unique combinations of mapping schemes and terrain indices. The maximum possible number of combinations is the number of census tracts.

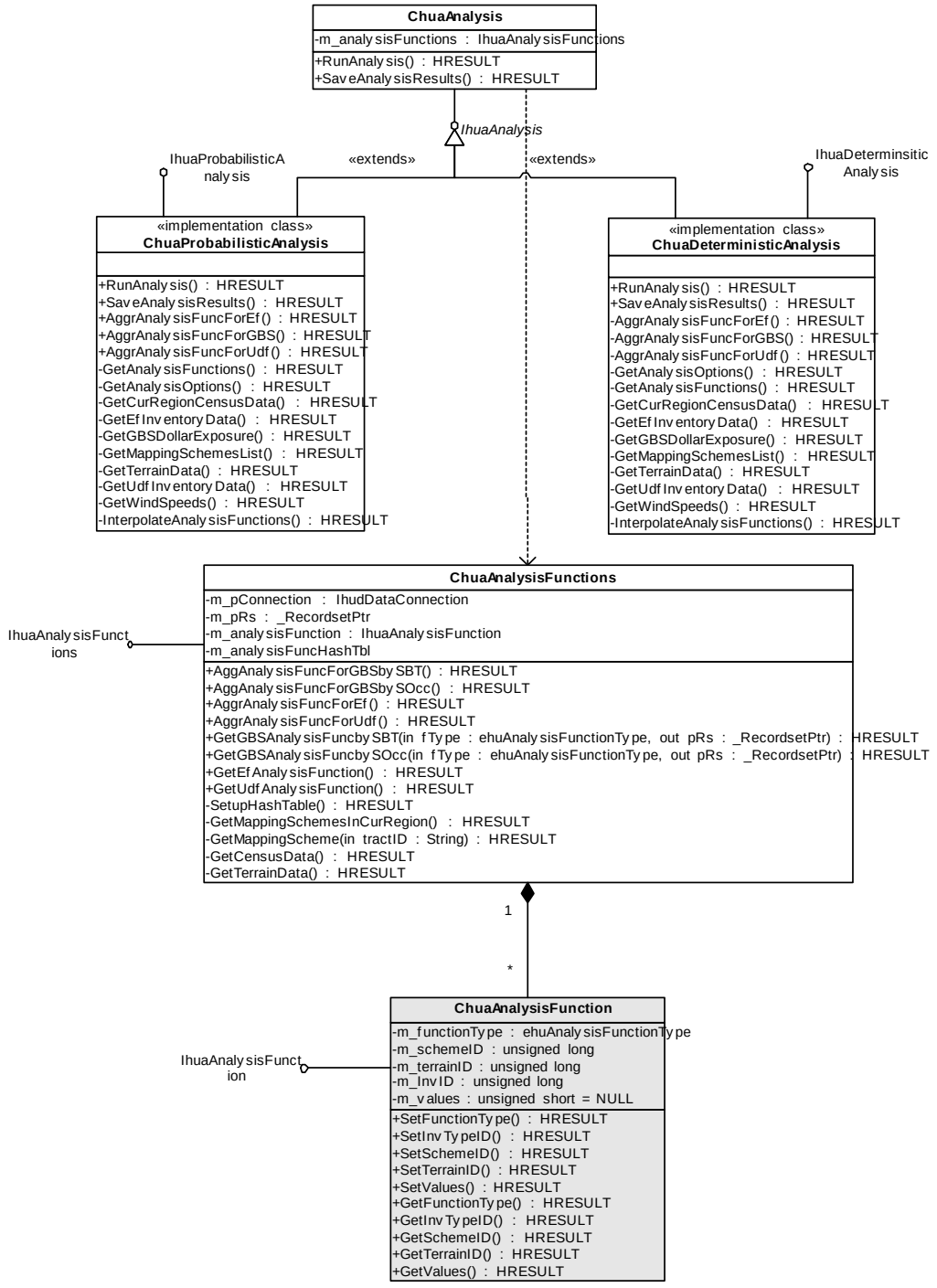

Figure 72. Class Diagram for the Analysis Engine Component

Table 28. List of Classes for the Analysis Engine Component

Name	Visibility	Abstract
ChuaAnalysis	Public	TRUE
ChuaProbabilisticAnalysis	Public	FALSE
ChuaDeterministicAnalysis	Public	FALSE
ChuaAnalysisFunctions	Public	FALSE
ChuaAnalysisFunction	Public	FALSE

Table 29. List of Interfaces for the Analysis Engine Component

Name	Visibility	Abstract
IhuaAnalysis	Public	TRUE
IhuaProbabilisticAnalysis	Public	FALSE
IhuaDeterministicAnalysis	Public	FALSE
IhuaAnalysisFunctions	Public	FALSE
IhuaAnalysisFunction	Public	FALSE

The aggregated analysis functions for the specific building types are used to compute those for the specific occupancy classes. This step is illustrated in Figure 74. The Specific Occupancy Mapping Schemes are used to weight the aggregated specific building type analysis functions to obtain the required specific occupancy analysis functions. A Specific Occupancy Mapping Scheme is an estimate of the makeup of a specific occupancy in a region as a function of the specific building types. For example, the specific occupancy RES1 (Single-Family Residential Dwellings) might have the following distribution in a particular census tract: 60% WSF1 (Wood Single Family-One Story), and 40% WSF2 (Wood Single Family – two or more stories). To calculate the building and contents loss functions for RES1 in that census tract, the aggregated analysis functions for WSF1 and WSF2 are weighted by their percent distribution. The result is a set of loss functions for RES1. Damage, debris, and shelter functions are aggregated in the same way for each occupancy class. Thus, the specific occupancy aggregated analysis functions for the general building stock are stored by wind building mapping scheme identifier, occupancy mapping scheme identifier, and terrain index.

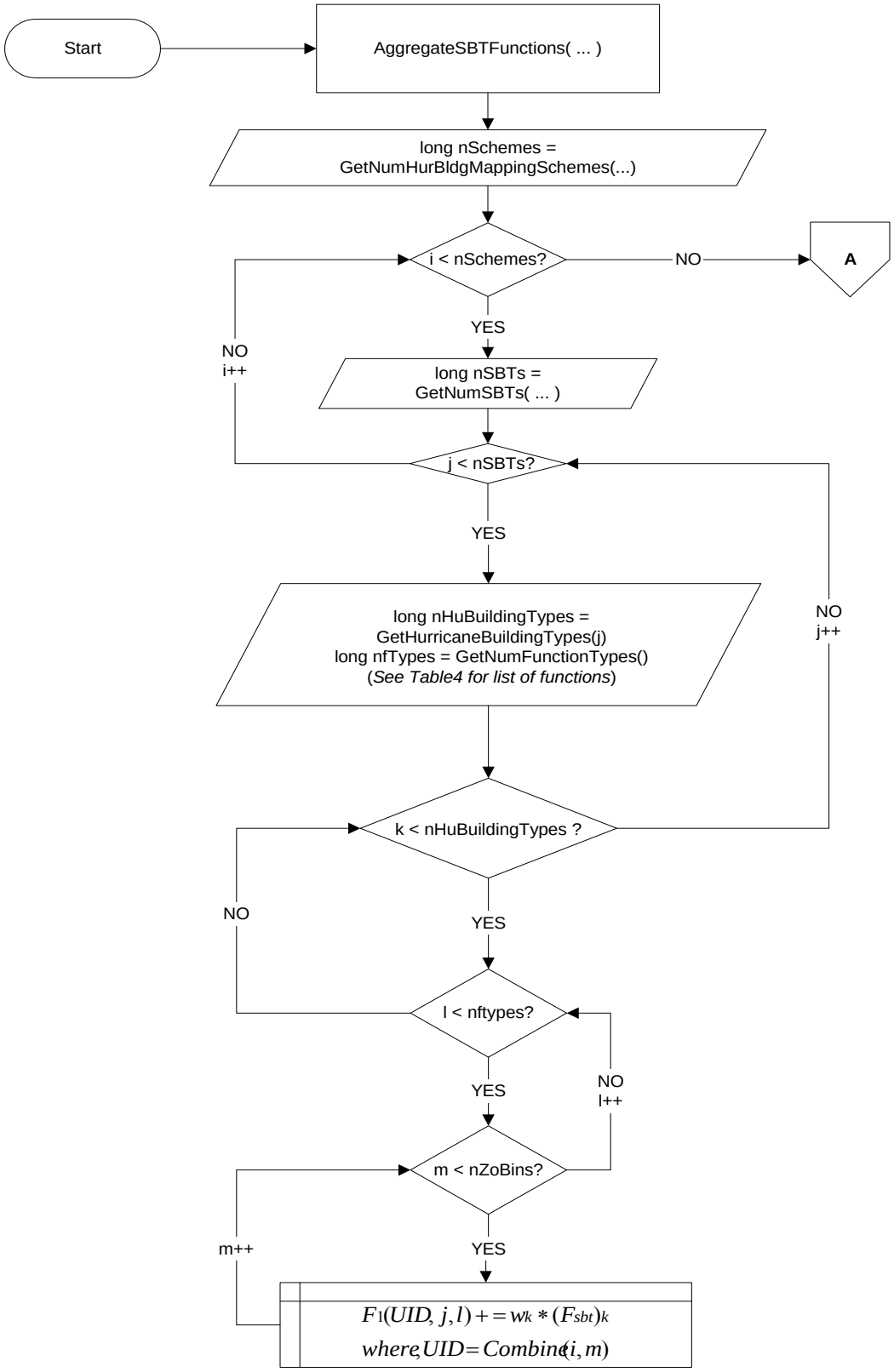

Figure 73. Aggregation of Damage and Loss Functions by Specific Building Type

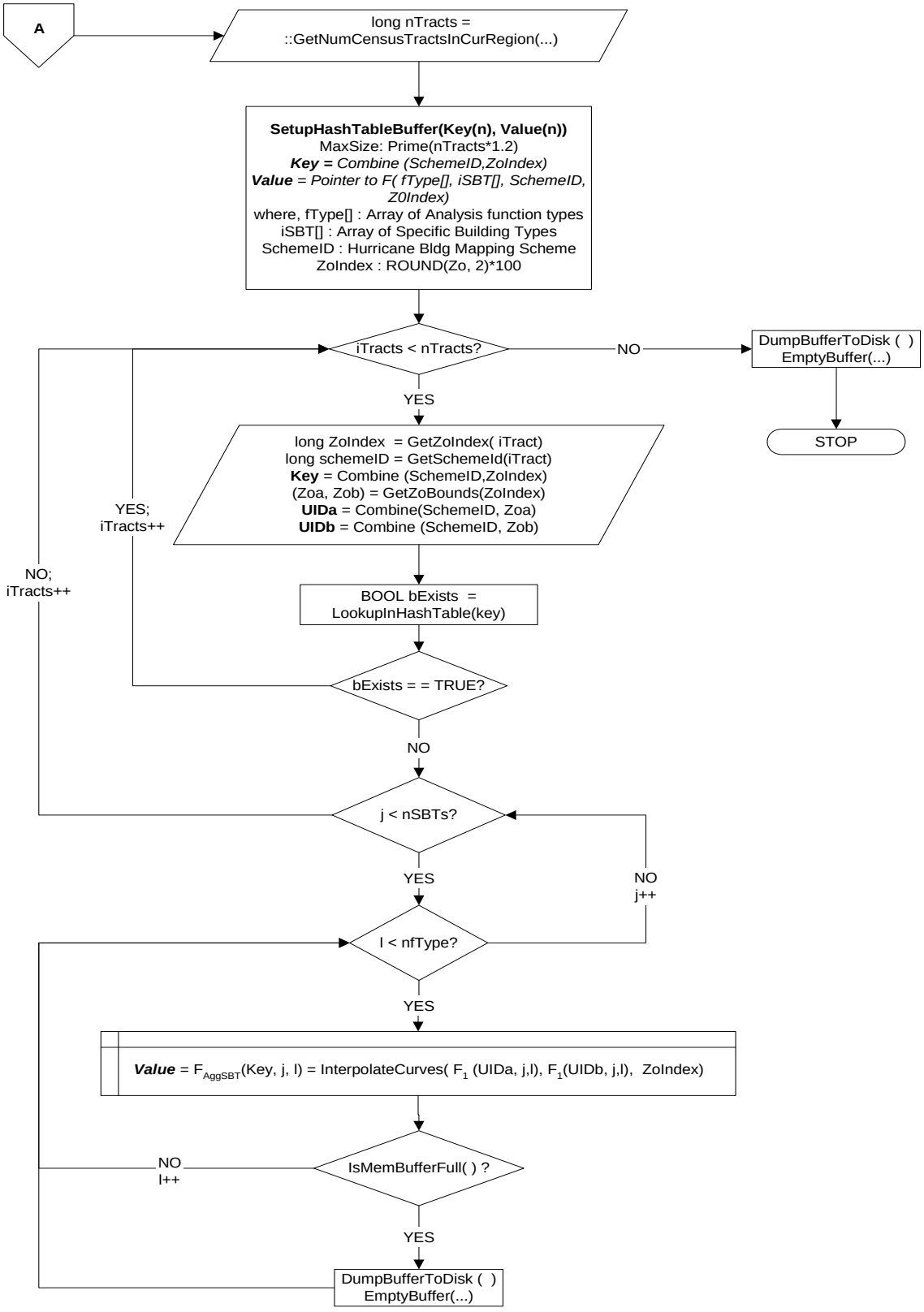

Figure 73. Aggregation of Damage and Loss Functions by Specific Building Type (continued)

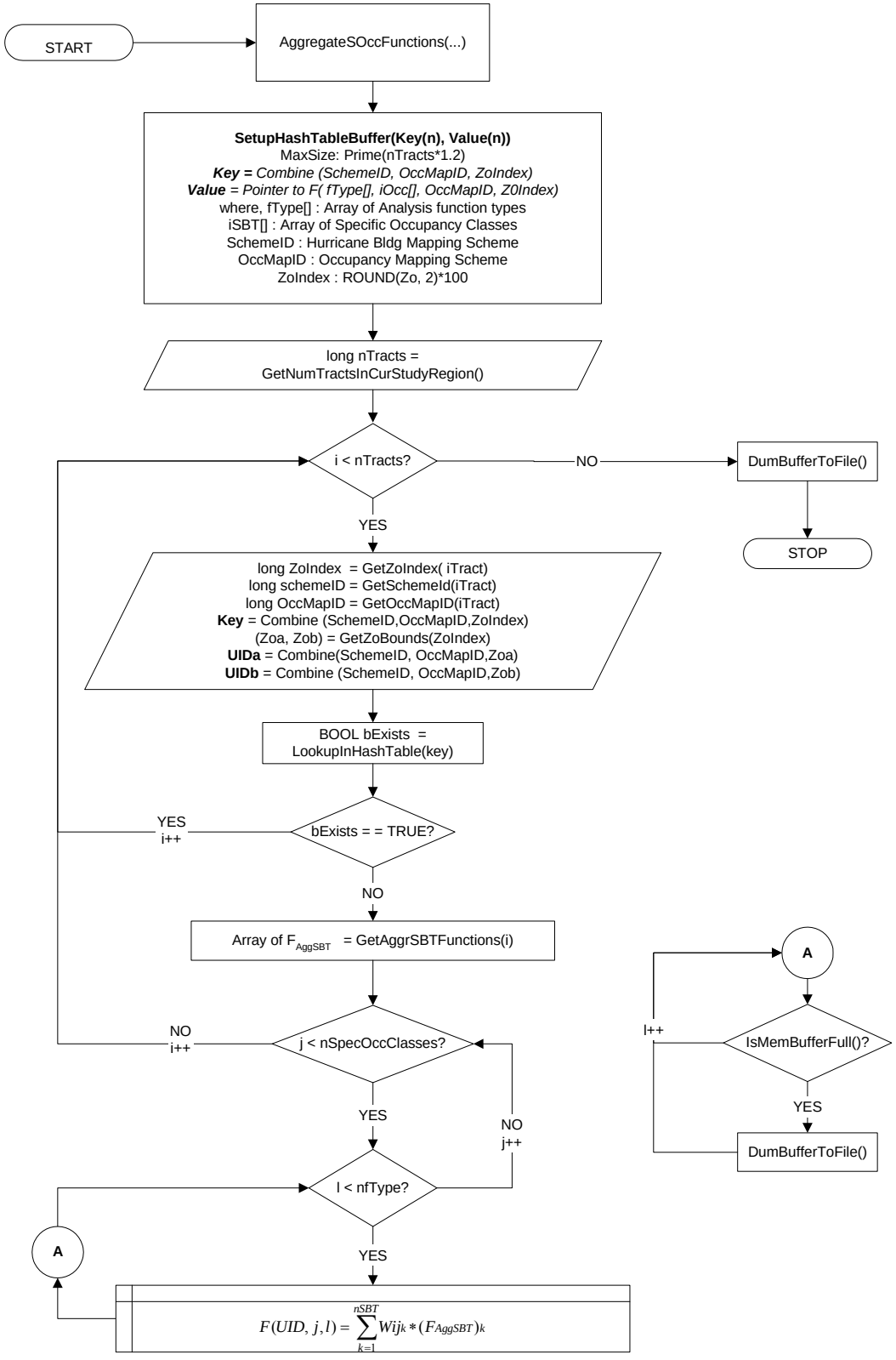

Figure 74. Aggregation of Damage and Loss Functions by Specific Occupancy Class

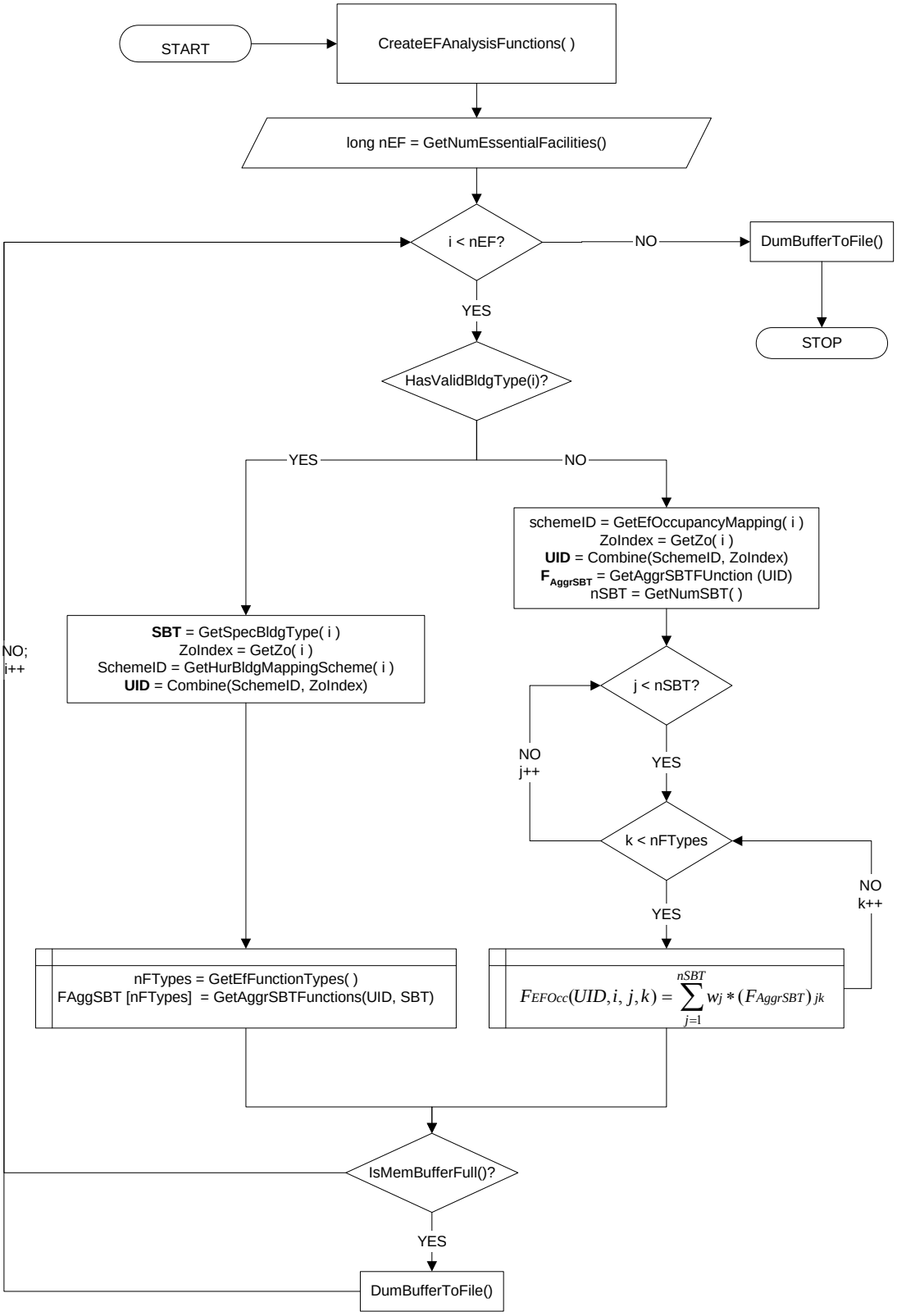

Figure 75. Computation of Damage and Loss Functions for Essential Facilities

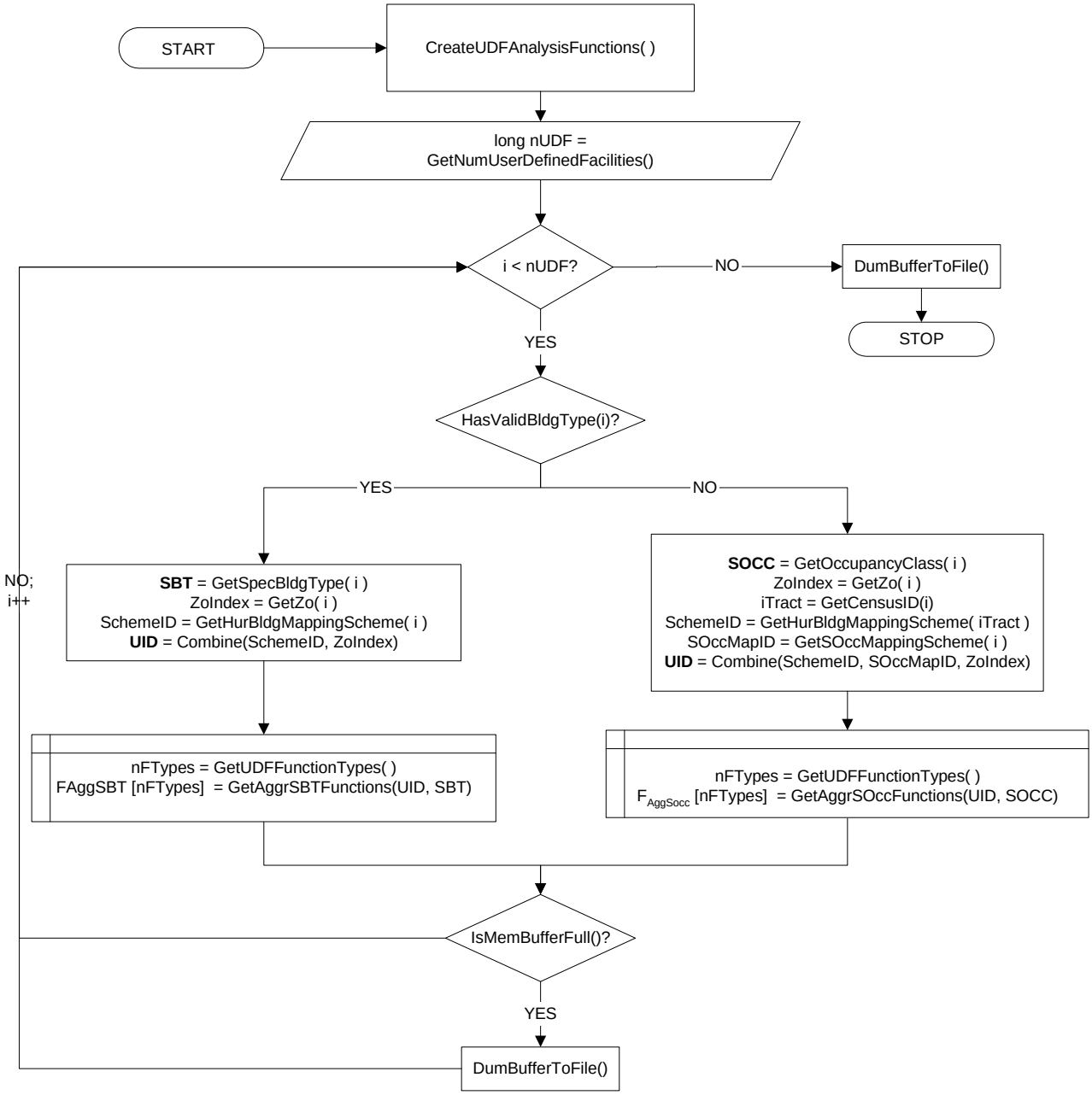

Figure 76. Computation of Damage and Loss Functions for User-Defined Facilities

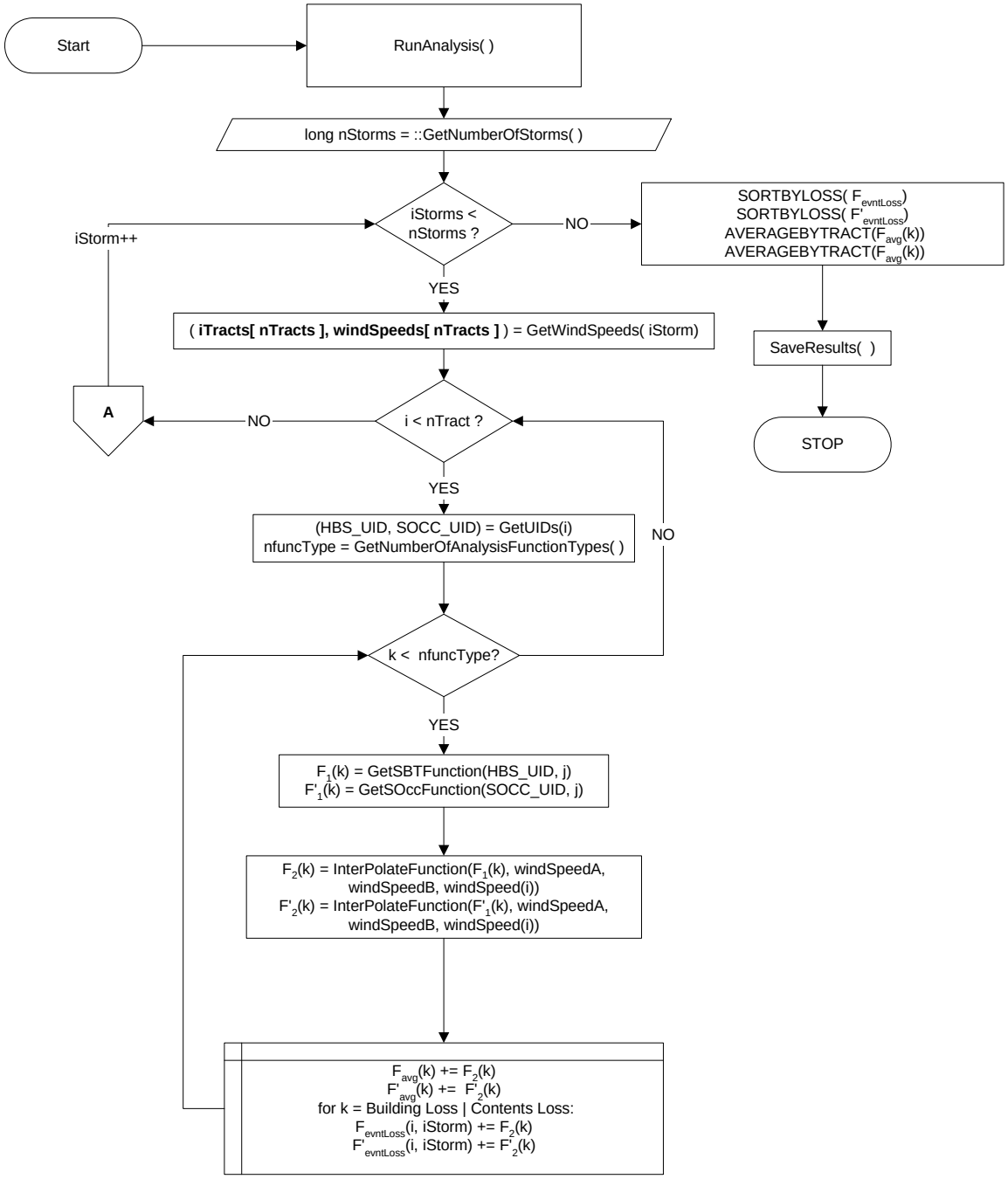

Figure 77. Flow Chart for Probabilistic Analysis

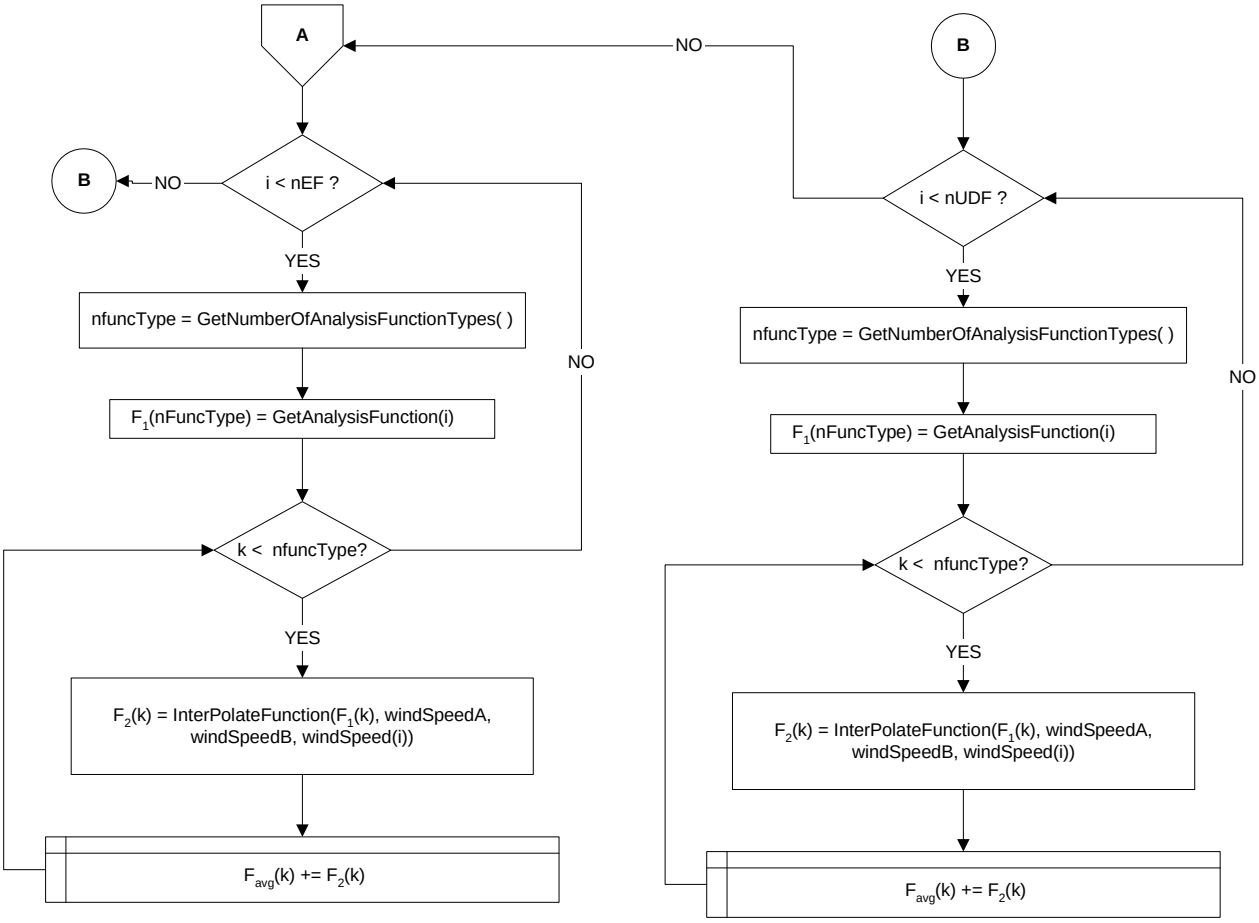

Figure 77. Flow Chart for Probabilistic Analysis (continued)

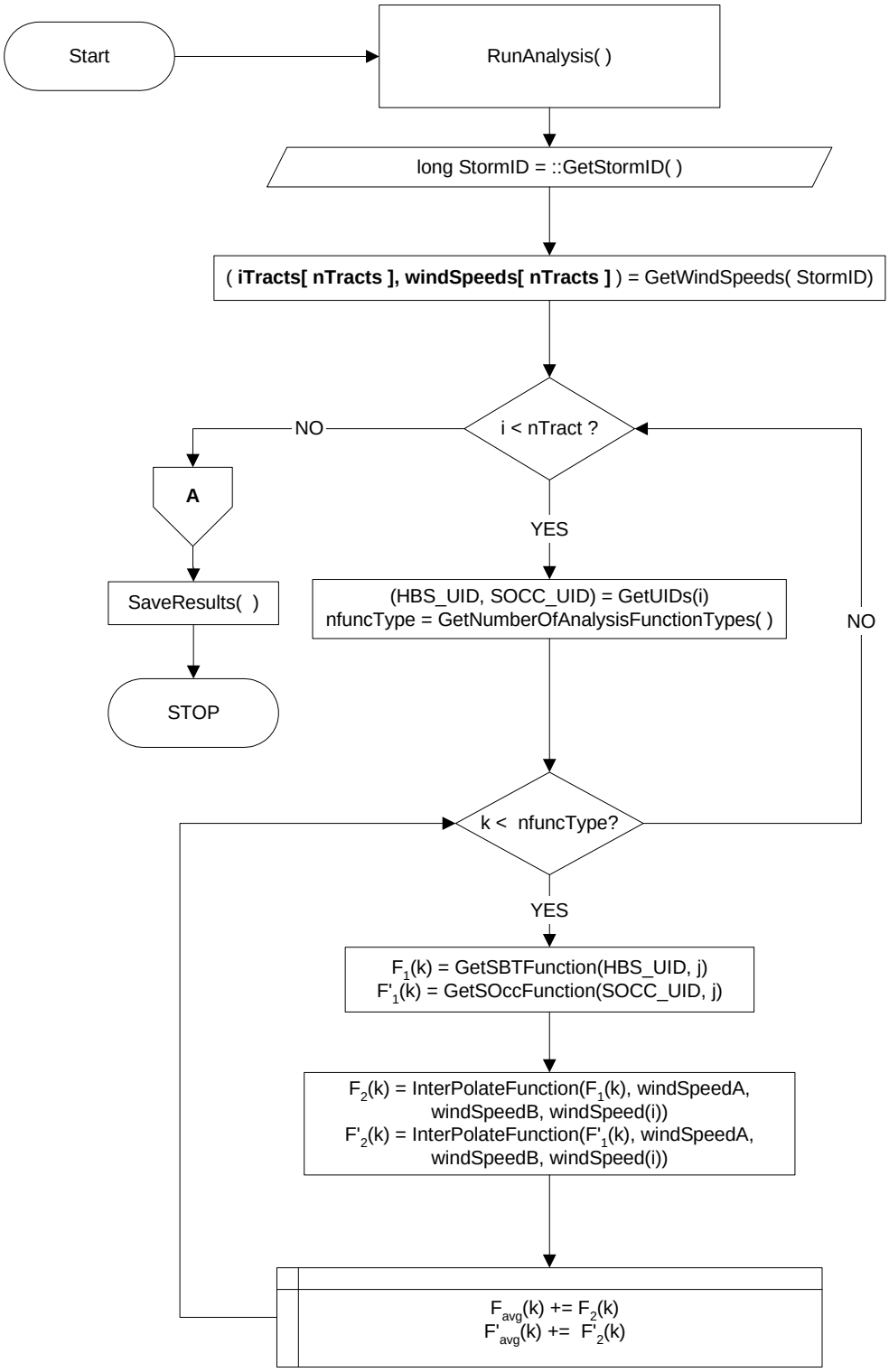

Figure 78. Flow Chart for Deterministic Analysis

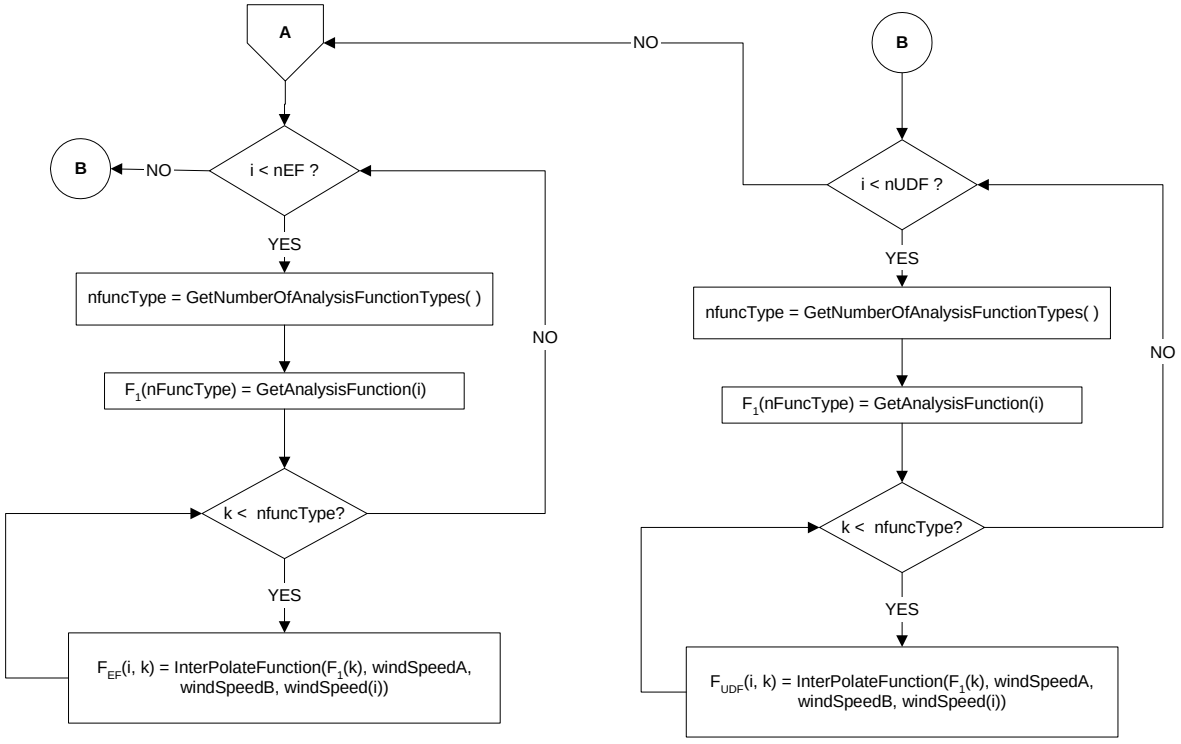

Figure 78. Flow Chart for Deterministic Analysis (continued)

For Essential Facilities (EF), the process is similar. Each EF in the study region is defined by an EF occupancy mapping class or a specific building type and a wind building mapping scheme. The default wind building mapping scheme is the mapping scheme for the census tract that contains the EF. However, the user can customize the mapping schemes associated with an EF. Results for EF consist of loss of use and damage states. See Figure 75 for the flow chart to obtain the aggregated loss of use and damage functions for EF.

Except for two differences, User-Defined Facilities (UDF) are handled in the same way as EF. First, UDF use the General Building Stock (GBS) occupancy mapping schemes. There are no specialized occupancy mapping schemes for UDF. Second, the only results computed for UDF are damage state probabilities. Otherwise, the methodology for UDF is the same as the EF methodology. Figure 76 shows the flow chart for aggregating UDF damage functions.

After the analysis functions are aggregated, the *RunAnalysis* method is called to run a probabilistic or deterministic analysis. The private *"Get"* methods are called internally during the analysis calculations to retrieve the required GBS, EF, UDF, and hazard data from the Data

layer. Figure 77 and Figure 78 show the flow charts for probabilistic and deterministic analyses, respectively.

3.1.2.2 Work Flow Package

Figure 79 shows the component diagram for the Work Flow package. The Work Flow package consists of four components: *huwInventory, huwHazard, huwAnalysis, and huwResults.*

The Work Flow package is invoked by the user interface layer. The Work Flow package is responsible for retrieving and updating data through the Data Services layer. It also invokes the Report Engine package to display summary reports and calls the Calculation Engine package when the user chooses to run an analysis or create a new user-defined scenario. The following sections describe the design description for the Work Flow components.

3.1.2.2.1 Inventory Component Design Description

The *huwInventory* component, shown in Figure 80, retrieves and updates the inventory data through the data services layer. Table 30 and Table 31 list the classes and interfaces for the *huwInventory* component.

The *ChuwRegion* coclass queries the *IhudRegion* interface of the data access layer to retrieve study region information such as, census blocks, census tracts, counties, demographics, etc.

The *ChuwGbs* coclass implements methods to retrieve and update the general building stock data through "*Get*" and "*Update*" methods. This class is also used to retrieve and update the general building stock mapping schemes.

The *ChuwEssentialFacilities* coclass is used to retrieve and update the essential facilities inventory data and occupancy mapping schemes. The *AddNew* method adds a new essential facility. The *Remove* method removes an essential facility based on the essential facility type and its UID (Unique Identifier). The *GetMappingScheme* method retrieves an essential facility mapping-scheme based on the mapping scheme UID.

The *ChuwUserDefinedFacilities* coclass retrieves and updates the user-defined inventory data. The user-defined facilities are mapped to general building stock occupancy classes or building

types and mapping schemes. Thus, no separate method is provided in the *ChuwUserDefinedFacilities* coclass to retrieve user-defined mapping schemes. The *AddNew* method is used to add a new facility and *Remove* method removes a user-defined facility based on its UID.

The *ChuwHPLFacilities*, *ChuwTransportationFacilities, ChuwUtilityFacilities, and ChuwHazmat* coclasses get the High Potential Loss Facilities, Transportation Facilities, Utility Systems, and Hazardous Materials Inventory data using the corresponding interfaces in the data services layer. In the Hurricane Model only "G*et"* methods are provided for these classes, as these data are currently available only for mapping and viewing.

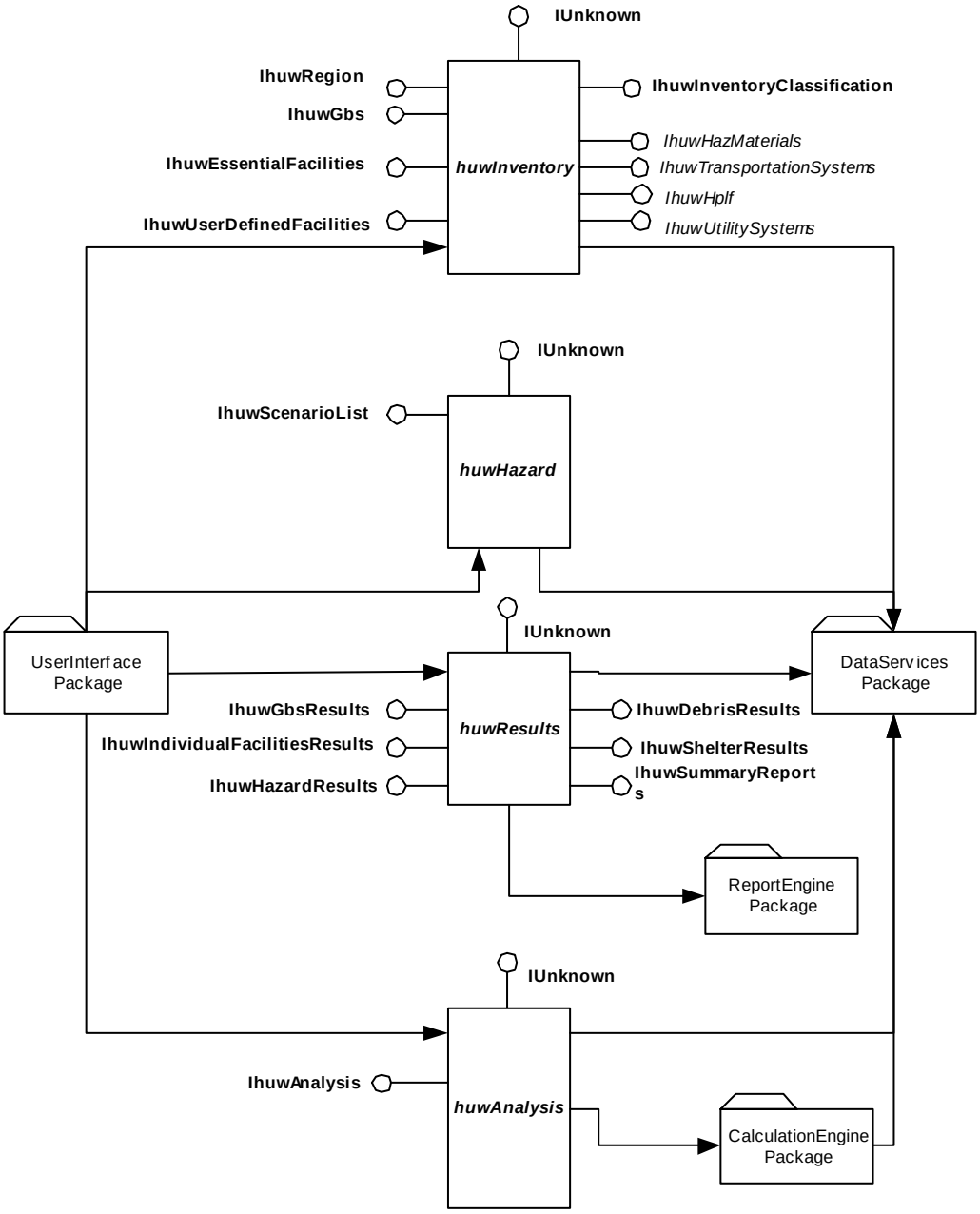

Figure 79. Component Diagram for the Work Flow Package

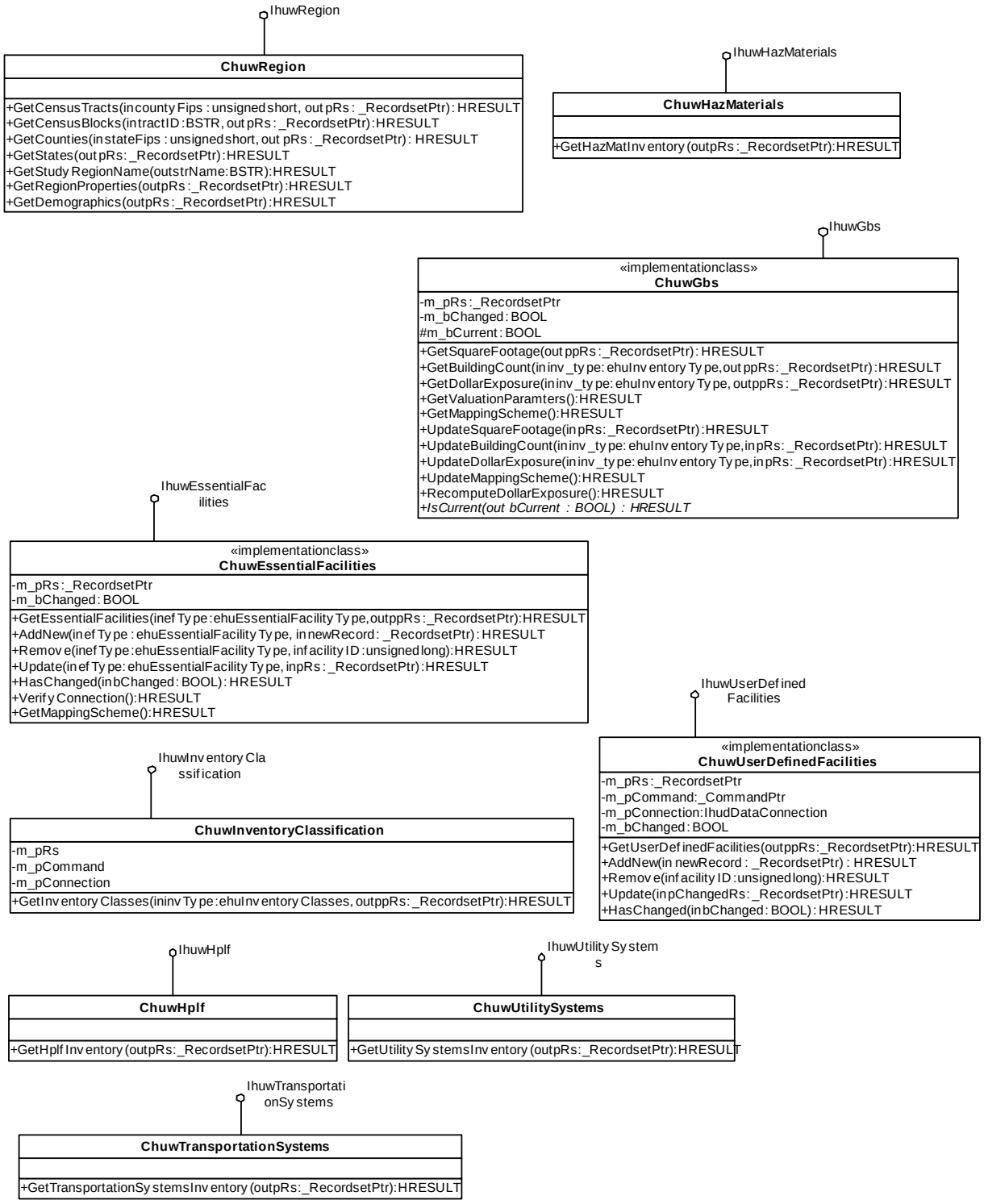

Figure 80. Class Diagram for the Inventory Component

Table 30. List of Classes for the Inventory Component

Name	Visibility	Abstract
ChuwRegion	Public	FALSE
ChuwGbs	Public	FALSE
ChuwEssentialFacilities	Public	FALSE
ChuwUserDefinedFacilities	Public	FALSE
ChuwHPLFacilities	Public	FALSE
ChuwUtilityFacilities	Public	FALSE
ChuwTransportationFacilities	Public	FALSE
ChuwHazmat	Public	FALSE
ChuwInventoryClasssification	Public	FALSE
ChuwDemographics	Public	FALSE
ChuwGbsMappingScheme	Public	FALSE

Table 31. List of Interfaces for the Inventory Component

Name	Visibility	Abstract
IhuwRegion	Public	FALSE
IhuwGbs	Public	FALSE
IhuwEssentialFacilities	Public	FALSE
IhuwUserDefinedFacilities	Public	FALSE
IhuwHPLFacilities	Public	FALSE
IhuwUtilityFacilitiess	Public	FALSE
IhuwTransportationFacilities	Public	FALSE
IhuwHazmat	Public	FALSE
IhuwInventoryClasssification	Public	FALSE
IhuwDemographics	Public	FALSE
IhuwGbsMappingScheme	Public	FALSE

3.1.2.2.2 Hazard Component Design Description

The Hazard component, shown in Figure 81, is used to retrieve and update the hurricane scenario data. The Hazard component is also responsible for invoking the Wind Field model during a deterministic analysis. Table 32 and Table 33 list the classes and interfaces for the *huwHazard* component.

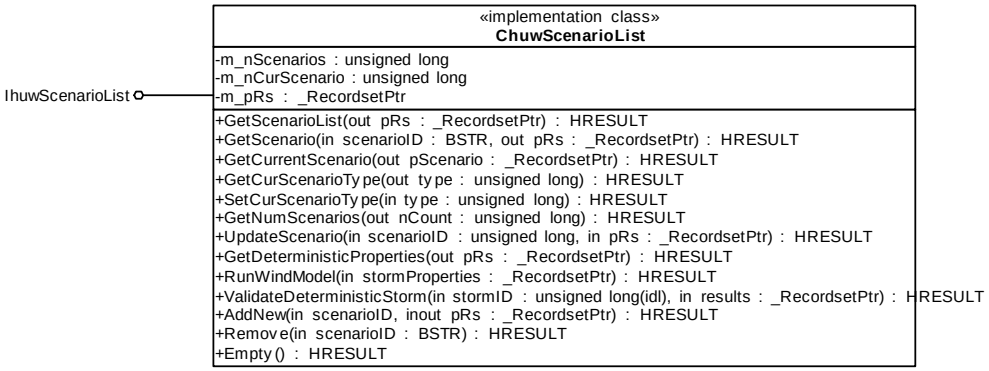

Figure 81. Class Diagram for the Hazard Component

Table 32. List of Classes for the Hazard Component

Name	Visibility	Abstract
ChuwScenarioManager	Public	FALSE
ChuwScenario	Public	FALSE
ChuwDeterministic	Public	FALSE
ChuwProbabilistic	Public	FALSE
ChuwHistoric	Public	FALSE
ChuwStormTrack	Public	FALSE

Table 33. List of Interfaces for the Hazard Component

Name	Visibility	Abstract
IhuwScenarioManager	Public	FALSE
IhuwScenario	Public	FALSE
IhuwDeterministic	Public	FALSE
IhuwProbabilistic	Public	FALSE
IhuwHistoric	Public	FALSE
IhuwStormTrack	Public	FALSE

The *ChuwScenario* class stores the list of storm scenarios in the *m_pRs* Recordset data member. Each record in the recordset corresponds to a storm scenario name, date created, date modified, and a scenario name. The *ChuwScenario* also stores the total number of scenarios and the current scenario name. The Put*Scenario* and *GetScenario* methods retrieve the scenario's parameters from the data services layer using the scenario name. The *AddScenario* method is used to add a new scenario to the scenario list.

3.1.2.2.3 Analysis Component Design Description

The Analysis component, shown in Figure 82, is used to retrieve and update analysis parameters such as loss functions, damage functions, debris parameters, etc. The Analysis component is also responsible for retrieving analysis output options when the user chooses to run an analysis. Table 34 and Table 35 list the classes and interfaces for the *huwHazard* component.

The *ChuwAnalysisParameters* class is responsible to retrieve and update analysis specific data. The *GetTerrain* and *UpdateTerrain* methods retrieve and update the terrain data.

The ChuwAnalysisFunctions class is used to retrieve a recorset containing the damage, loss, debris, and restoration functions by the hurricane specific building type and the wind building type.

Analysis options can be retrieved through the *GetUserDefinedAnalysisOptions* method. To retrieve the default analysis options the *GetDefaultAnalysisOptions* method is used. To save the last user-defined analysis option, the *UpdateAnalysisOptions method* is used.

The *ChuwTreeParameters* and *ChuwShelterParameters* retrieve the tree damage functions and Shelter Parameters respectively. Chuw*BuildingEconomic* retrieve the building economic parameters such as, cost modifiers, etc.

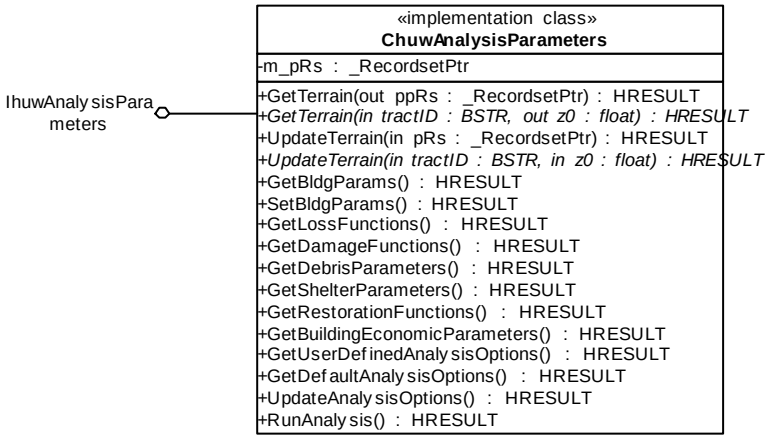

Figure 82. Class Diagram for the Analysis Component

Table 34. List of Classes for the Analysis Component

Name	Visibility	Abstract
ChuwAnalysisParameters	Public	FALSE
ChuwAnalysisFunctions	Public	FALSE
ChuwBuildingEconomic	Public	FALSE
ChuwOutputOptions	Public	FALSE
ChuwShelterParameters	Public	FALSE
ChuwTreeParameters	Public	FALSE

Table 35. List of Interfaces for the Analysis Component

Name	Visibility	Abstract
IhuwAnalysisParameters	Public	FALSE
IhuwAnalysisFunctions	Public	FALSE
IhuwBuildingEconomic	Public	FALSE
IhuwOutputOptions	Public	FALSE
IhuwShelterParameters	Public	FALSE
IhuwTreeParameters	Public	FALSE

3.1.2.2.4 Results Component Design Description

The Results component retrieves and saves data to the results database through the data services layer. As shown in Figure 83, the huwResults component also retrieves report parameter data from the database in order to display the Hurricane Model summary reports. Table 36 and Table 37 list the classes and interfaces for the *huwResults* component.

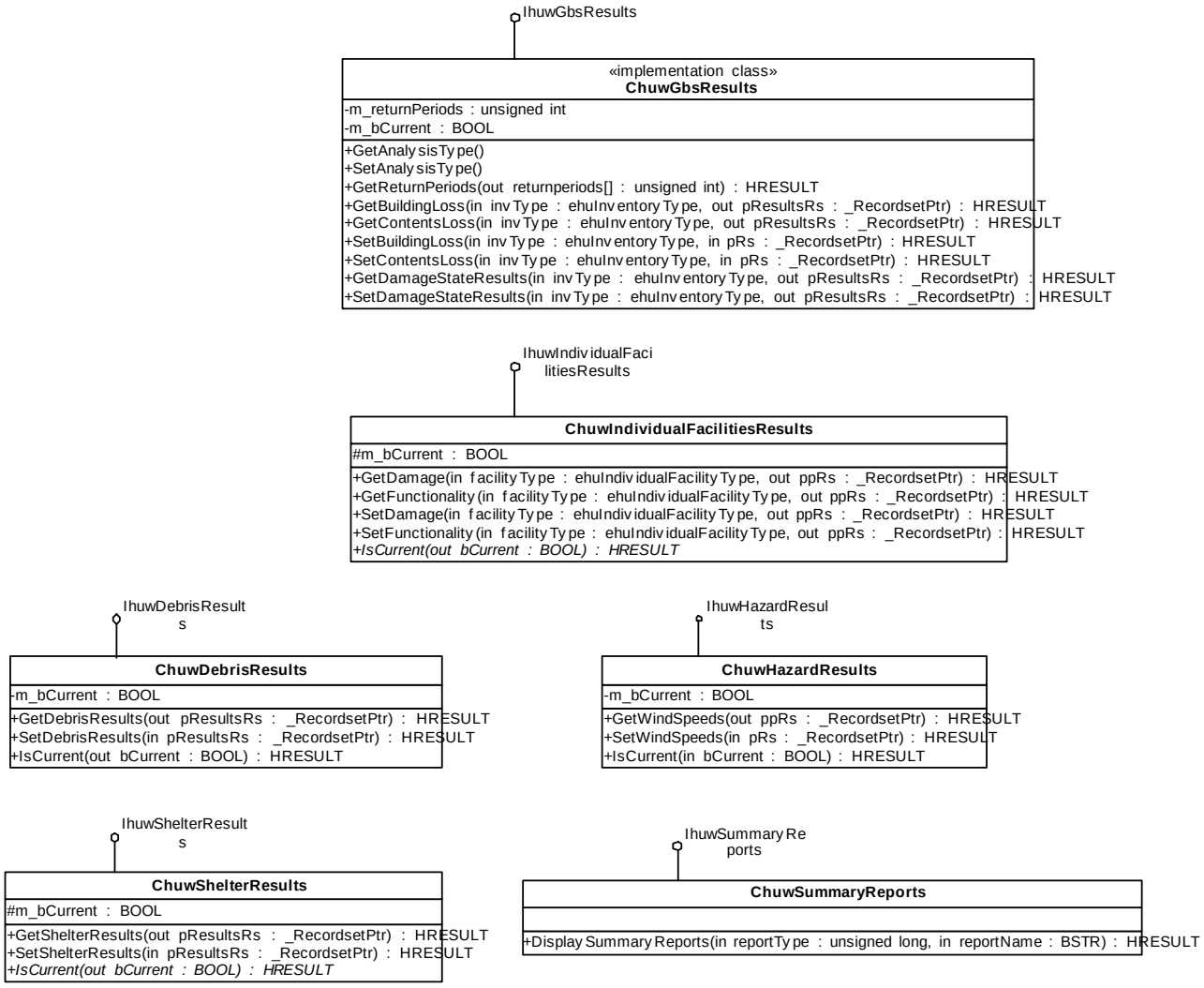

Figure 83. Class Diagram for the Results Component

Table 36. List of Classes for the Results Component

Name	Visibility	Abstract
ChuwGbsResults	Public	FALSE
ChuwIndividualFacilitiesResults	Public	FALSE
ChuwDebrisResults	Public	FALSE
ChuwShelterResults	Public	FALSE
ChuwHazardResults	Public	FALSE
ChuwSummaryReports	Public	FALSE
ChuwEssentialFacilitiesResults	Public	FALSE
ChuwUserDefinedFltyResults	Public	FALSE

Table 37. List of Interfaces for the Results Component

Name	Visibility	Abstract
IhuwGbsResults	Public	FALSE
IhuwIndividualFacilitiesResults	Public	FALSE
IhuwDebrisResults	Public	FALSE
IhuwShelterResults	Public	FALSE
IhuwHazardResults	Public	FALSE
IhuwSummaryReports	Public	FALSE
IhuwEssentialFacilitiesResults	Public	FALSE
IhuwUserDefinedFltyResults	Public	FALSE

3.1.3 Presentation Layer Design

The Presentation layer is decomposed into the User Interface package and the Report Engine package. The User Interface package talks to the Work Flow package in the Application layer to retrieve data, run the analysis engine, and display summary reports. The Report Engine package interfaces with Crystal Reports to generate and display individual summary reports. Section 3.1.3.1 describes the User Interface package design and Section 0 describes the Report Engine package design.

3.1.3.1 User Interface Package

The components of the HM User Interface package handle the user events that are specific to the hurricane model. All other events are either directly handled by ArcObjects or are directed to the HAZUS Shell API. Figure 84 shows the component diagram for the UI. The User Interface package consists of five COM components: *hupUIControls*, *hupTabularDataDisplay*, *hupChartDataDisplay*, *hupWizards*, and *hupSummaryReports*.

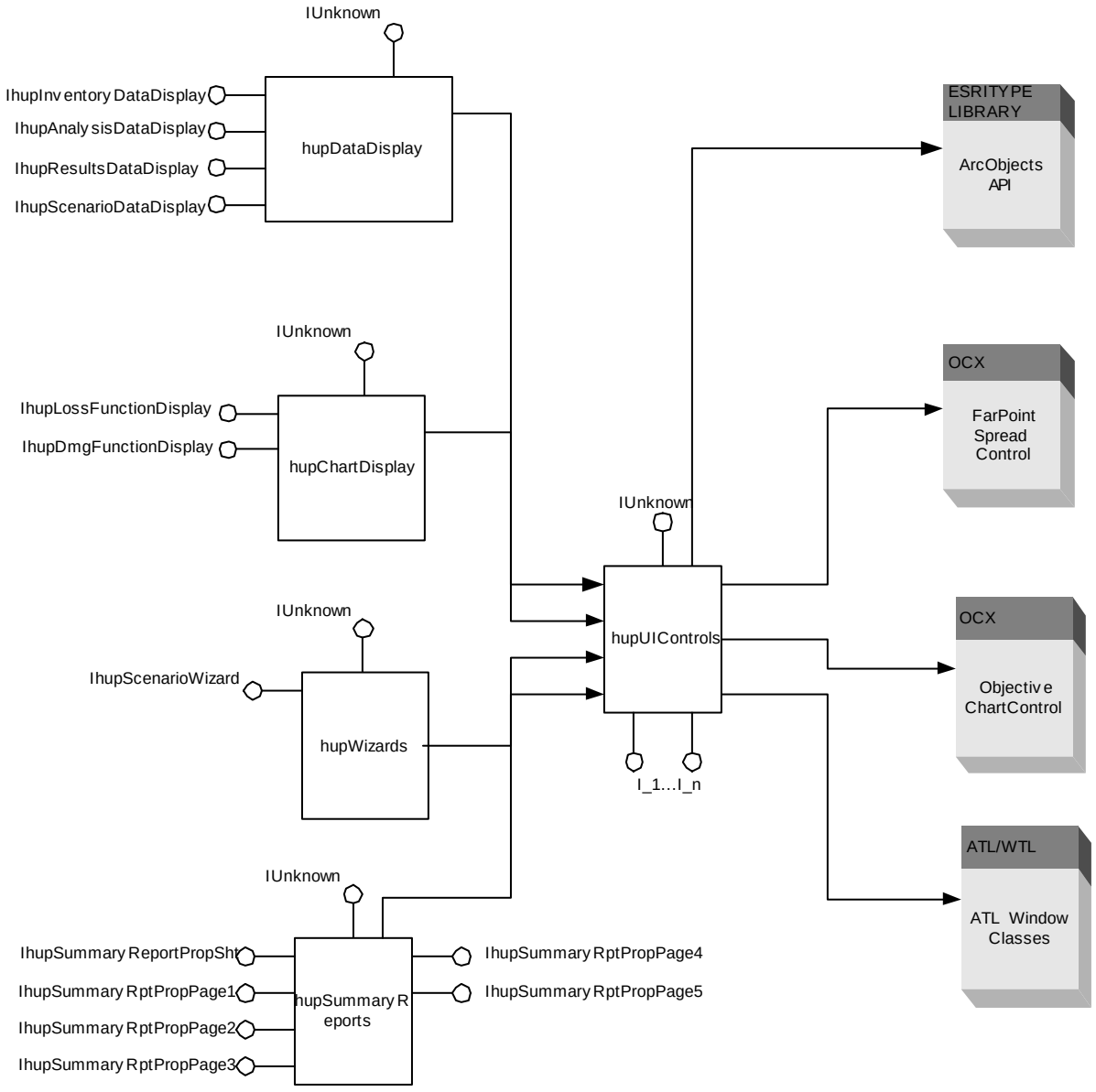

Figure 84. Component Diagram for the User Interface Package

3.1.3.1.1 User Interface Controls Component Design Description

The *hupUIControls* component is a COM component that consists of template window classes that act as helper classes in implementing the HM User Interface components. It includes generalized classes for dialogs, browsers (i.e., dialogs with a Spread Sheet OCX Control, and other common controls), chart dialogs that use the Objective Chart OCX Control, Property Pages, Property Sheets, Wizards, Tree Controls, Tab Controls, and other common controls.

Figure 85 shows the class design for implementing the data browsers. The data browsers are classified into four categories: Simple Dialog Browser, Dialog Browser with controls, Tabbed Browser, and Tabbed Browser with controls. Table 38 and Table 39 list the classes and interfaces required to implement the data browsers.

The Simple dialog browser is implemented through the *ChupDialogBrowser* class that inherits from the *CAxDialogImpl<class T>* Active Template Library (ATL) class. This is the simplest of all the data browsers. It consists of a Far Point Spread OCX Control, a customizable context menu, Ok, Cancel, Apply, and Map buttons. The context menu is customized based on the data being displayed. Only data that can be viewed on the map have an active Map button. Browsers that have extra controls like combo-boxes, radio buttons, and/or check-boxes *use* the *ChupDialogBrowserEx* class. The *ChupDialogBrowserEx* class *extends* the *ChupDialogBrowser* class.

The *ChupTabBrowser* class implements the tabbed data browsers. Each *ChupTabBrowser* object is a collection of *ChupTabBrowserPage* objects. A maximum of twenty tabs can be added to a *ChupTabBrowser* object. The *ChupTabBrowser* and *ChupTabBrowserPage* classes *extend* the *CAxDialogImpl<class T>* Active Template Library (ATL) class. Browsers that have extra controls like combo-boxes, radio buttons, and/or check-boxes *use* the *ChupTabBrowserPageEx* class. The *ChupTabBrowserPageEx* class *extends* the *ChupTabBrowserPage* class.

The Spread Control is customized based on the data type, number of records of data, data width, read/write access, text color etc. Each dialog browser class consists of methods to customize the spreadsheet at run-time.

The Browser Dialog interfaces discussed above will support the *hupDataDisplay* component (see Section 3.1.3.1.2). Additional interfaces to support chart dialogs, wizards, tree controls, and other common user interface features are also being developed. Skeletal class diagrams are provided where appropriate in the following sections to indicate these additional services of the *hupUIControls* component.

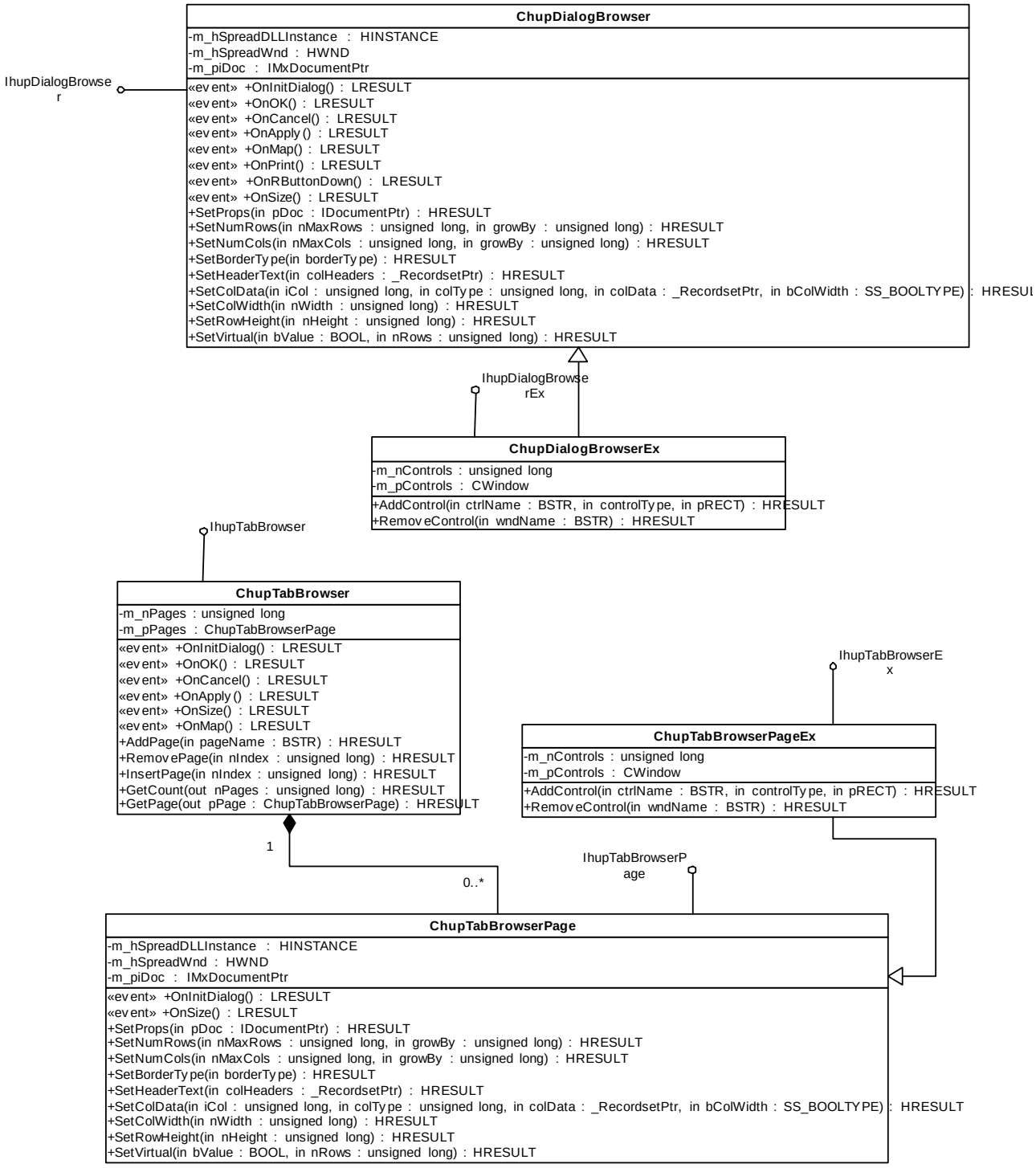

Figure 85. Class Diagram for the Browser Dialog Classes in the UI Controls Component

Table 38. List of Browser Dialog Classes for the UI Controls Dialog Browser Component

Name	Visibility	Abstract
ChupDialogBrowser	Public	FALSE
ChupDialogBrowserEx	Public	FALSE
ChupTabBrowser	Public	FALSE
ChupTabBrowserPage	Public	FALSE
ChupTabBrowserPageEx	Public	FALSE

Table 39. List of Browser Dialog Interfaces for the UI Controls Component

Name	Visibility	Abstract
IhupDialogBrowser	Public	FALSE
IhupDialogBrowserEx	Public	FALSE
IhupTabBrowser	Public	FALSE
IhupTabBrowserPage	Public	FALSE
IhupTabBrowserPageEx	Public	FALSE

3.1.3.1.2 Tabular Data Display Component Design Description

Figure 86 shows the *hupTabularDataDisplay* component classes and their associations with the *hupUIControls* component. Table 40 and Table 41 list the classes and interfaces required to implement the Tabular Data Display component. The *ChupInventoryDataDisplay, ChupAnalysisParamsData Display*, and *ChupResultsDataDisplay* coclasses implement the methods to display all of the tabular inventory, analysis, and results data, respectively.

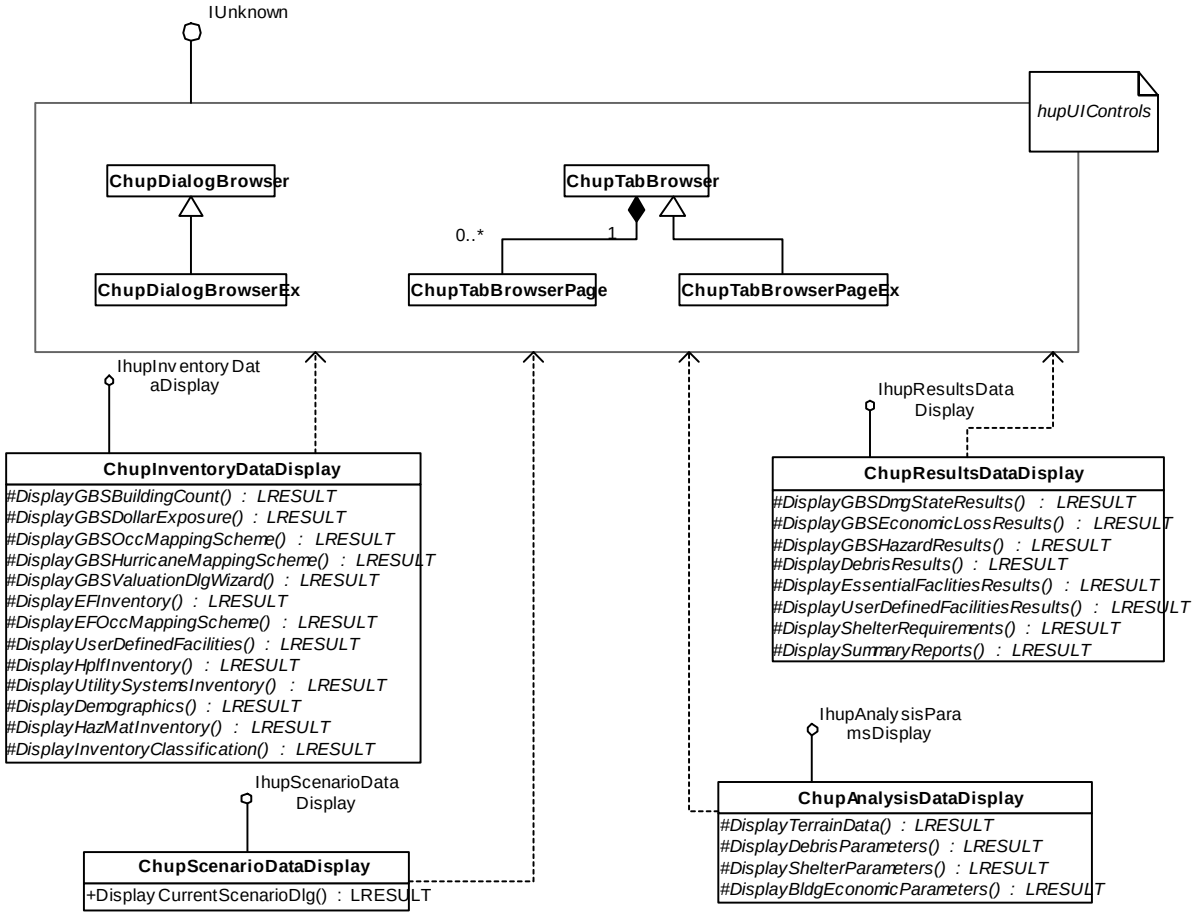

Figure 86. Class Diagram for the Tabular Data Display Component

Table 40. List of Classes for the Tabular Data Display Component

Name	Visibility	Abstract
ChupInventoryDataDisplay	Public	FALSE
ChupAnalysisDataDisplay	Public	FALSE
ChupScenarioDataDisplay	Public	FALSE
ChupResultsDataDisplay	Public	FALSE

Table 41. List of Interfaces for the Data Display Component

Name	Visibility	Abstract
IhupInventoryDataDisplay	Public	FALSE
IhupAnalysisDataDisplay	Public	FALSE
IhupScenarioDataDisplay	Public	FALSE
IhupResultsDataDisplay	Public	FALSE

3.1.3.1.3 Chart Display Component Design Description

Loss and damage functions can be viewed as graphs in the HM GUI using the Chart Display component. The *hupChartDialog* component, shown in Figure 87, consists of two interfaces, *IhupLossFunctionDisplay* and *IhupDamageFunction Display* that help to display the loss and damage functions as graphs. The *hupUIControls* component will include the *ChupChartDisplayDialog* class, which implements the dialog to display loss and damage functions. This class consists of a tree control, an objective chart OCX control, and combo-boxes. For the current version of the HM, the chart control is not editable.

The *ChupDamageFunctionDisplay* and *ChupLossFunctionDisplay* coclasses implement the following methods:

- *GetBldgParams*: Retrieves the building characteristics for a specific building type as a Recordset Object. The data are used by the *ChupChartDisplayDialog* object to populate the tree control with specific building types, and the combo boxes with building characteristics.

- *SetBldgParams*: Based on the user inputs, the *SetBldgParams* changes the building characteristic Recordset object. This object is used by the *GetDamageFunctions* or *GetLossFunctions* methods to retrieve the appropriate damage or loss functions.

- *DisplayDamageFunctions* or *DisplayLossFunctions*: The methods display loss and damage functions by calling the *DoModal* method for Creating and initializing the *ChupChartDisplayDialog*.

The *ChupChartDisplayDialog* class consists of the following data members:

- *m_hChartLibrary*: HINSTANCE handle to the chart library.

- *m_hChartCtrlWnd*: Chart control HWND object.

- *m_piDoc*: pointer to ArcObjects Document Interface object.

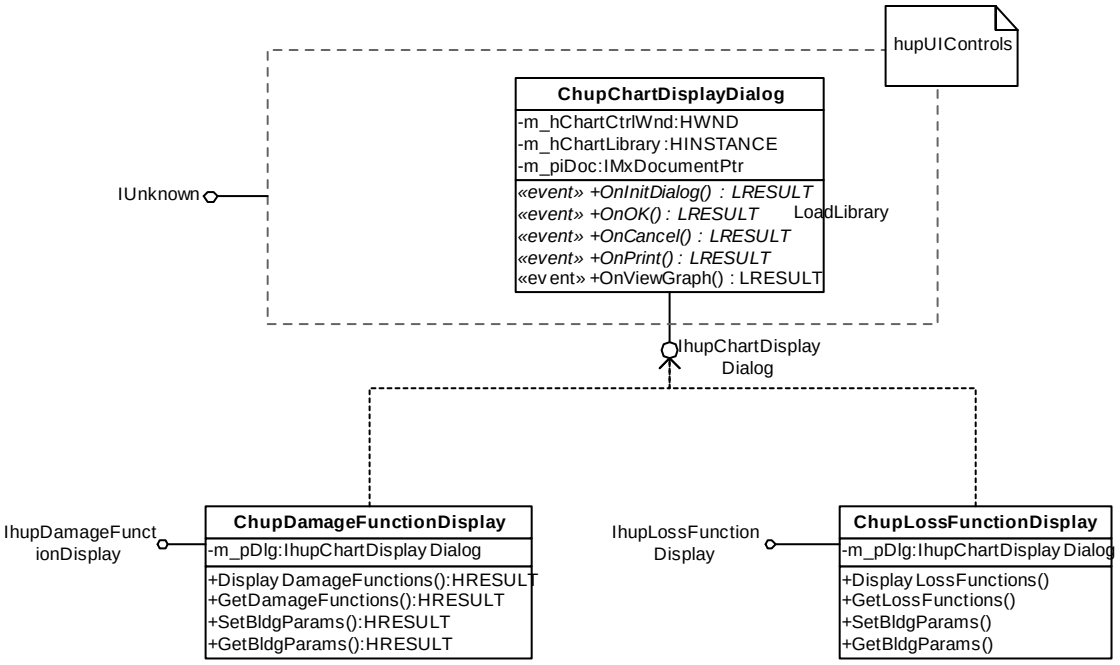

Figure 87. Class Diagram for the Chart Display Component

Table 42 and Table 43 list the classes and interfaces for the Chart Display component. These tables also include the *ChartDisplayDialog* class and interfaces from the UI controls component, which are used by the Chart Display component.

Table 42. List of Classes for the Chart Display Component

Name	Visibility	Abstract
ChupChartDisplayDialog	Public	FALSE
ChupLossFunctionDisplay	Public	FALSE
ChupDamageFunctionDisplay	Public	FALSE

Table 43. List of Interfaces for the Chart Display Component

Name	Visibility	Abstract
IhupChartDisplayDialog	Public	FALSE
IhupLossFunctionDisplay	Public	FALSE
IhupDamageFunctionDisplay	Public	FALSE

3.1.3.1.4 Wizard Component Design Description

The *hupWizards* component uses the *hupUIControls* component to display data using wizards and property sheets. The HM uses the Wizard component to define hurricane scenarios. The Scenario wizard follows the Microsoft Wizard 97 style guidelines.

Figure 88 shows the class diagram for the Wizard component. The *ChupScenarioWizard* inherits the *IhupWiz97PropSheet* interface. The *IhupWiz97PropSheet* interface is implemented by the C*hupWiz97PropSheet* coclass which inherits from the *ChupPropertySheet* class. The Scenario wizard consists of two main pages (one at the beginning and one at the end of the wizard) and eight internal pages. Each of these pages inherits the *IhupWiz97PropPage* interface and is associated with a dialog resource. The wizard start page describes the purpose and scope of the wizard. The internal pages have headers that provide brief descriptions about the current page. The last page summarizes the user actions and informs the user about the purpose of the *finish* button. Each internal page has a back and next button to move to the previous or next page in the wizard.

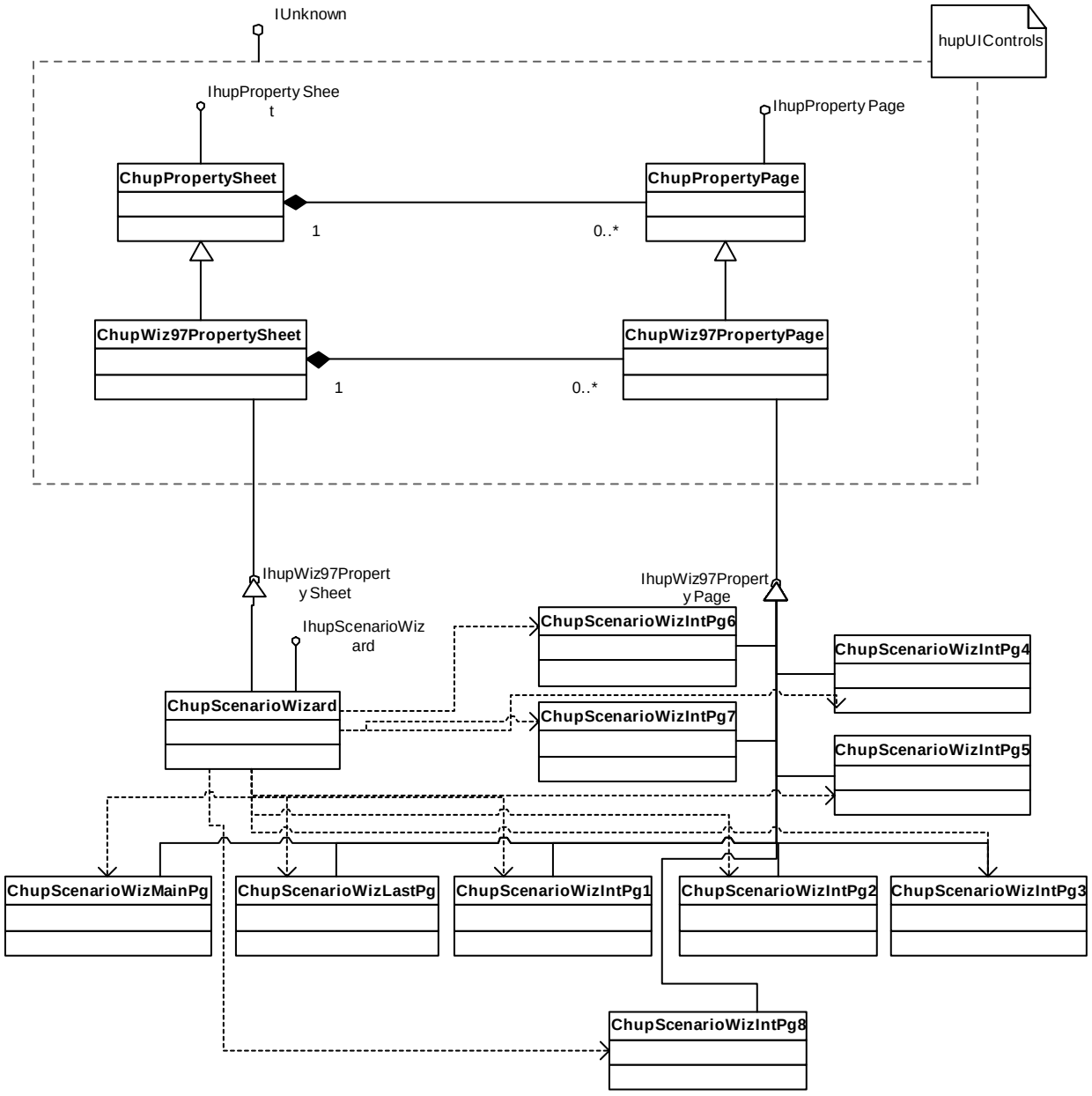

Figure 88. Class Diagram for the Wizard Component

Table 44 and Table 45 list the classes and interfaces for the Wizard component. Also included in these tables are classes and interfaces from the UI Controls component that are used by the Wizard component.

Table 44. List of Classes for the Wizard Component

Name	Visibility	Abstract
ChupPropertySheet	Public	FALSE
ChupWiz97PropertySheet	Public	FALSE
ChupPropertyPage	Public	FALSE
ChupWiz97PropertyPage	Public	FALSE
ChupScenarioWizard	Public	FALSE
ChupScenarioWizMainPg	Public	FALSE
ChupScenarioWizLastPg	Public	FALSE
ChupScenarioWizIntPg1	Public	FALSE
ChupScenarioWizIntPg2	Public	FALSE
ChupScenarioWizIntPg3	Public	FALSE
ChupScenarioWizIntPg4	Public	FALSE
ChupScenarioWizIntPg5	Public	FALSE
ChupScenarioWizIntPg6	Public	FALSE
ChupScenarioWizIntPg7	Public	FALSE
ChupScenarioWizIntPg8	Public	FALSE

Table 45. List of Interfaces for the Wizard Component

Name	Visibility	Abstract
IhupPropertySheet	Public	FALSE
IhupWiz97PropertySheet	Public	FALSE
IhupPropertyPage	Public	FALSE
IhupWiz97PropertyPage	Public	FALSE
IhupScenarioWizard	Public	FALSE

3.1.3.1.5 Summary Reports Component Design Description

Figure 89 shows the class diagram for implementing the Summary Reports component. The *ChupSummaryReport* coclass inherits the *IhupPropertySheet* interface. There are five types of summary reports: Inventory, Buildings, Induced Losses, Direct Losses, and Other Reports. Each report type has a property page class associated with it, i.e. *ChupSummaryReportPg1*, *ChupSummaryReportPg2*, *ChupSummaryReportPg3, ChupSummaryReportPg4*, and *ChupSummaryReportPg4*. Each of these coclasses inherit the *IhupPropertyPage* interface.

Table 46 and Table 47 list the classes and interfaces for the Summary Report Dialog component. Also included in these tables are classes and interfaces from the UI Controls component that are used by the Summary Reports Dialog component.

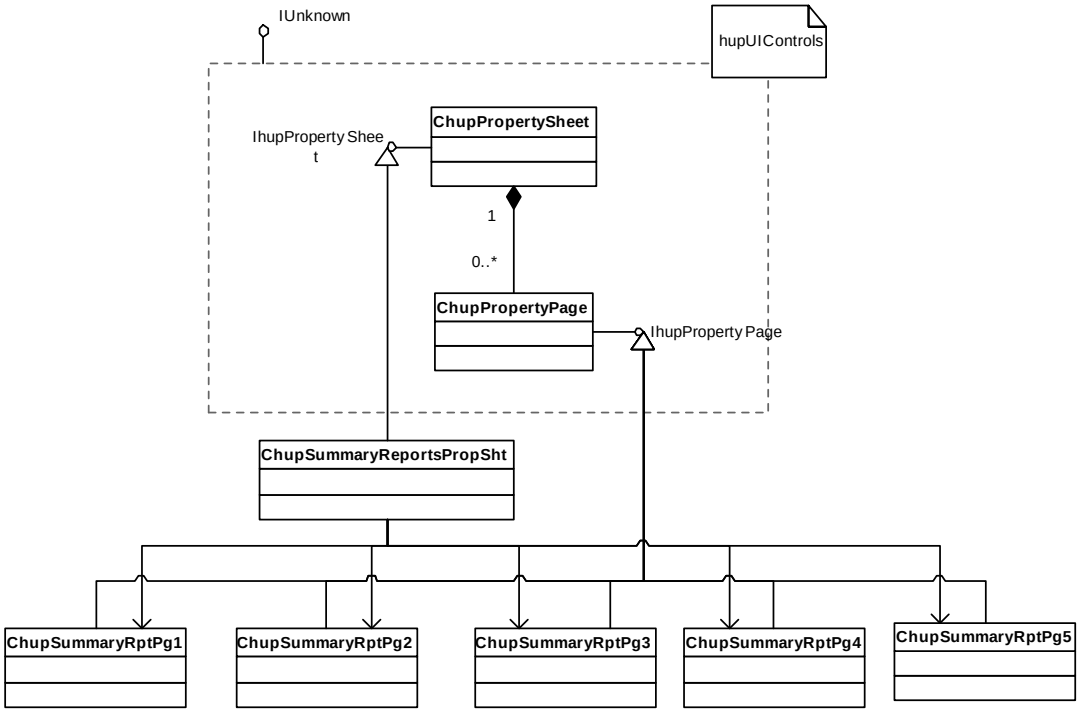

Figure 89. Class Diagram for the Summary Reports Dialog Component

Table 46. List of Classes for the Summary Reports Dialog Component

Name	Visibility	Abstract
ChupPropertySheet	Public	FALSE
ChupPropertyPage	Public	FALSE
ChupSummaryReportPropSht	Public	FALSE
ChupSummaryRptPropPg1	Public	FALSE
ChupSummaryRptPropPg2	Public	FALSE
ChupSummaryRptPropPg3	Public	FALSE
ChupSummaryRptPropPg4	Public	FALSE
ChupSummaryRptPropPg5	Public	FALSE

Table 47. List of Interfaces for the Summary Reports Dialog Component

Name	Visibility	Abstract
IhupPropertySheet	Public	FALSE
IhupPropertyPage	Public	FALSE
IhupSummaryReportPropSht	Public	FALSE
IhupSummaryRptPropPg1	Public	FALSE
IhupSummaryRptPropPg2	Public	FALSE
IhupSummaryRptPropPg3	Public	FALSE
IhupSummaryRptPropPg4	Public	FALSE
IhupSummaryRptPropPg5	Public	FALSE

3.1.3.2 Report Engine Package

The Report Engine package is used to create and display the HAZUS Hurricane Model Summary Reports. The summary reports are displayed using Crystal Reports 8.0. Figure 90 shows the component diagram for the HM Report Engine package. The Report Engine is referenced by the Work Flow package. When the user selects the *Summary Report* menu item in the user interface, the menu event handler function notifies the Work Flow package, which then creates an instance of the *huaReportEngine* component and calls the *CreateReportView* method through the *IhuaSummaryReport* interface. The *CreateViewReport* takes the “type of report” as the input parameter.

The *IhuaSummaryReport* interface is implemented in the *ChuaSummaryReport* coclass. The *CreateReportView* method creates a *ChuaReportViewer* object and invokes the *OnInitDialog* method to display the report viewer using the Report Designer Component (RDC). The *ChuaReportViewer* constructor calls the *LoadCRLibrary* method that loads the Crystal Report RDC dynamic link library at run-time. The *m_hRDCLibrary* data member is of type *HINSTANCE* and stores an instance of the RDC library. When the viewer is closed the *ChuaReportViewer* destructor is called which releases the library from memory. The *OnInitDialog* method calls the *OpenSummaryReport* method that opens the Crystal Report file (*.rpt) template. The report file is refreshed to get the latest data from the database.

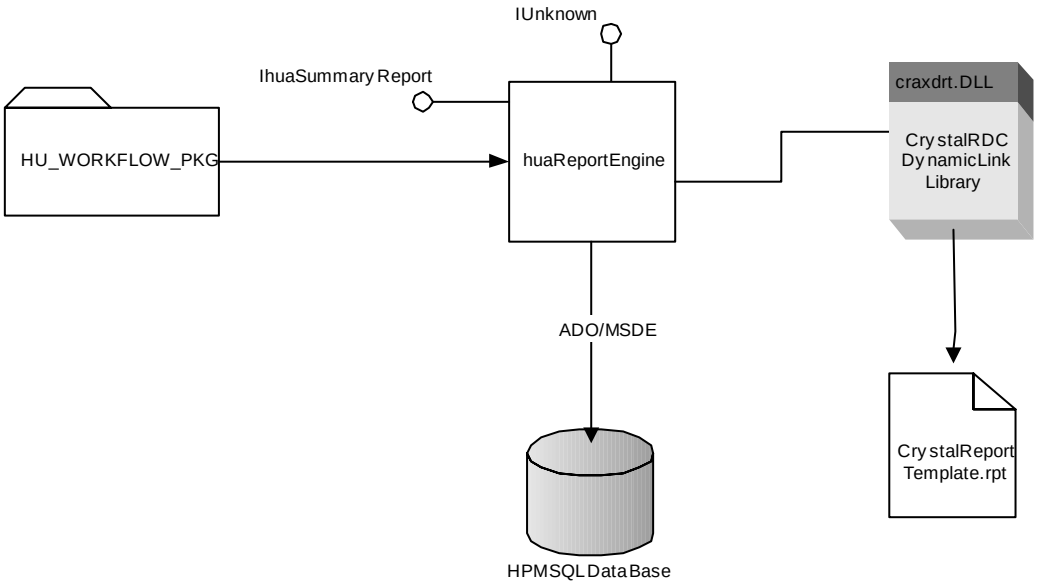

Figure 90. Component Diagram for the Report Engine Package

The class diagram for the Report Engine component is shown in Figure 91. The *ChuaReportViewer* object can only be created by the *huaSummaryReport* class. Once the report is created and opened the *ChuaReportViewer* will receive and handle all the user events. The *OnPrint* event handles the print command and prints the report to the default printer connected to the computer. The *OnExport* method handles the export command and exports the current crystal report to a variety of formats: HTML 3.0, DHTML, Rich Text Format, and Flat Text Format etc. The report viewer consists of the system toolbar on the top right corner. The user shall be able to minimize, maximize or close the viewer using this toolbar. The *OnOK* and *OnCancel* methods close the dialog and return focus to the main application.

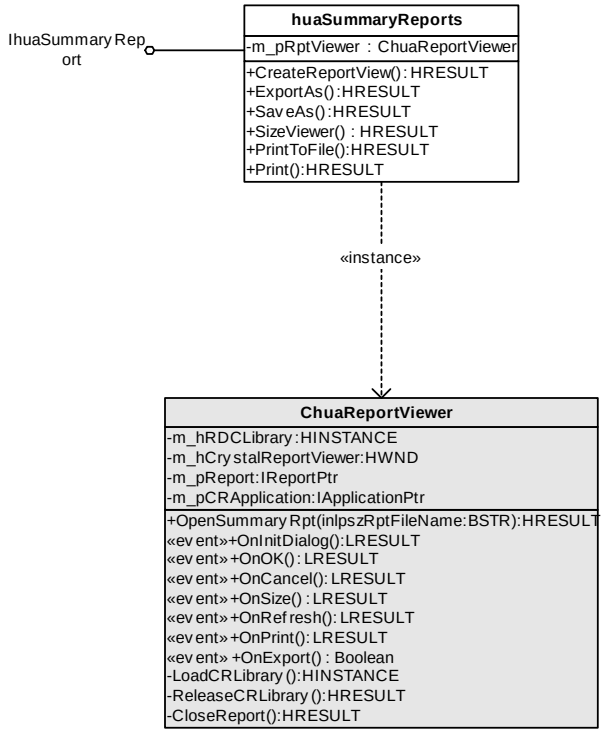

Figure 91. Class Diagram for the Report Engine Component

3.2 Dependency Design Description

This section describes the design entities through a series of sequence diagrams. The diagrams illustrate the dependency relationships between the three design entities in the HM software namely, the Data layer, the Application layer, and the Presentation layer.

Sequence diagrams are dynamic diagrams that show interactions between objects through messages or operations. Messages are shown as arrows. A dotted arrow is used for return messages. A sequence diagram also can be used to depict the life of an object. Typically, a sequence diagram consists of an Actor Object and many Software Objects.

The actor initiates the sequence of events in a sequence diagram. For the sequence diagrams shown in this section the Actor is assumed to be a HAZUS User. Software objects are instances of classes in the HM Software System and are depicted as rectangular boxes with vertical lines at the bottom of each box. The vertical line indicates the life of the object.

The actor interacts with the GUI objects. For example, in Figure 92 the Actor wishes to see the building count data by census tract. The actor clicks on the Inventory | GBS | Building Count menu item that fires *DisplayGBSBuildingCount( )* event. This event is handled by the *ChupInventoryDataDisplay* coclass. The *ChupInventoryDataDisplay* object instantiates the *ChupTabBrowser* object, which in turn instantiates the *ChupTabBrowserPageEx* object. The *ChupInventoryDataDisplay* object populates the data table by accessing the *ChuwGBS* WorkFlow coclass. The *ChuwGBS* object calls the *ChudGBS* object to retrieve the required data from the underlying SQL Server database using ADO.

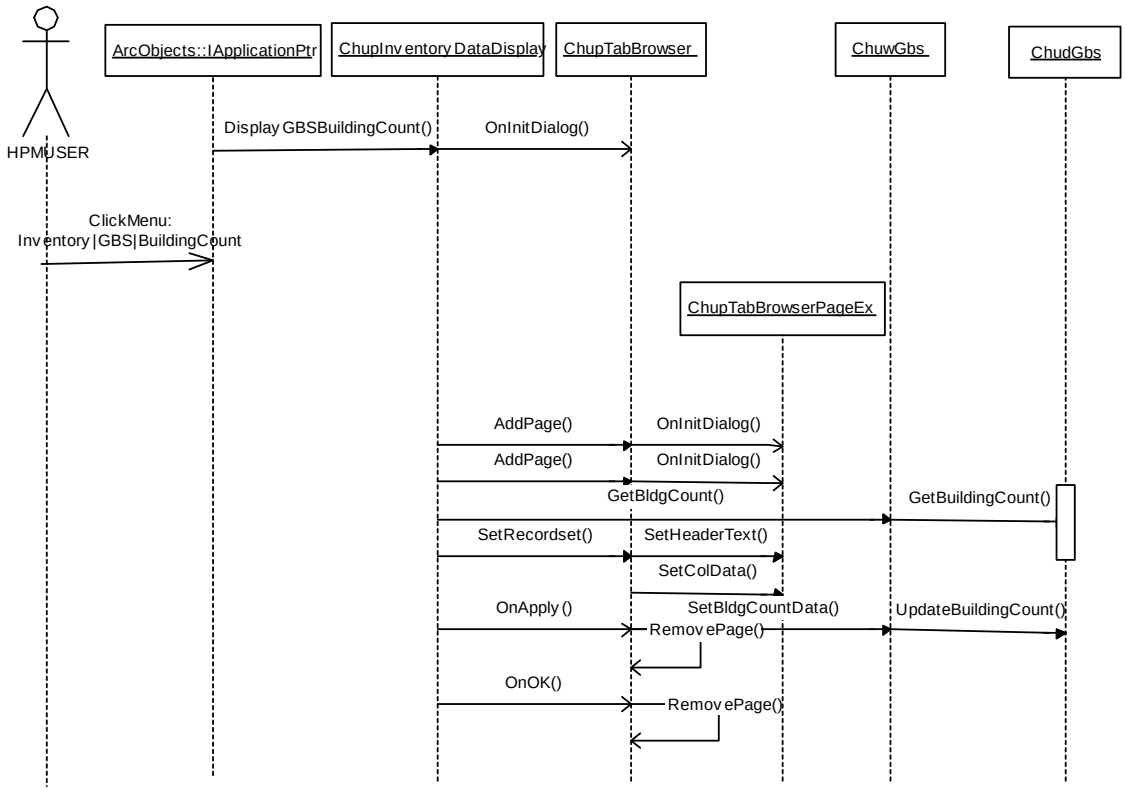

Figure 92. Sequence Diagram for Viewing the Building Count by Occupancy

The user can now map the building count data by selecting a column in the data table. The *OnColSel( )* method is fired to the *ChupTabBrowser* object activates the map button. When the user presses the map button the *OnMap( )* method sends a message to the *ArcObjects::IapplicationPtr* interface to display the column data on the map. The user then can

click the OK or CANCEL button that send a series of messages to each of the objects to clean up and destroy themselves.

Figure 93 steps through the sequence of events when a user defines a deterministic storm scenario. Figure 94 illustrates the sequence of events that occur when the user views and changes the terrain data. Figure 95 shows the sequence of events for computing a user-defined wind field, and Figure 96 shows the events that are responsible to display summary reports using Crystal Reports.

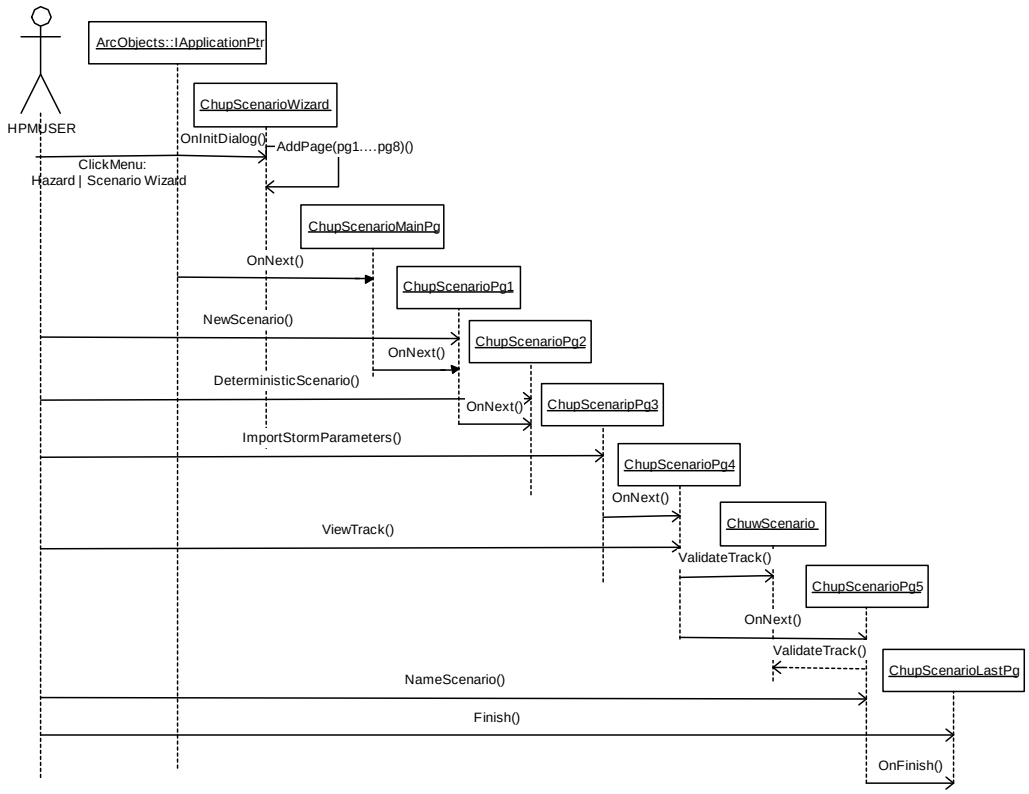

Figure 93. Sequence Diagram for Creating a User-Defined Storm

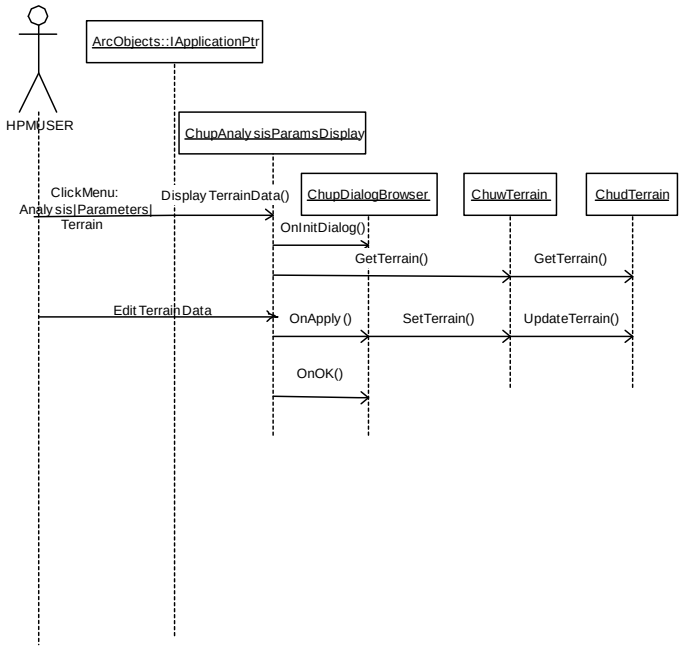

Figure 94. Sequence Diagram for Modifying Terrain

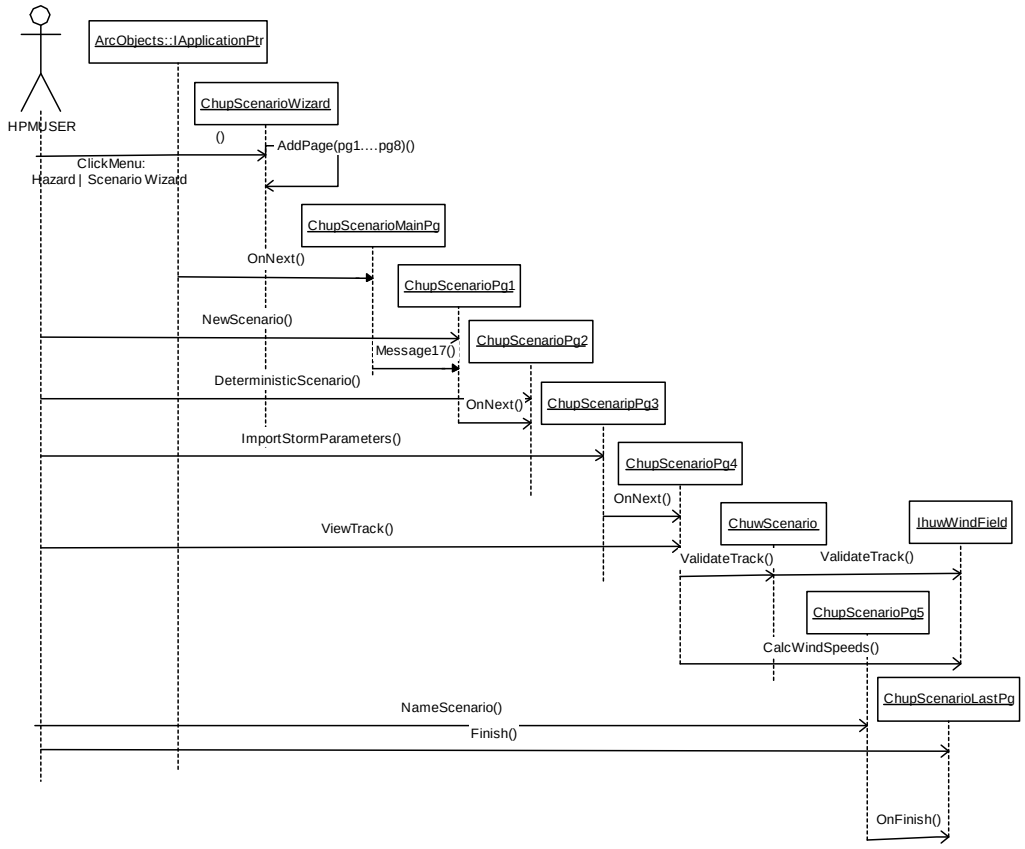

Figure 95. Sequence for Computing a Deterministic Wind Field

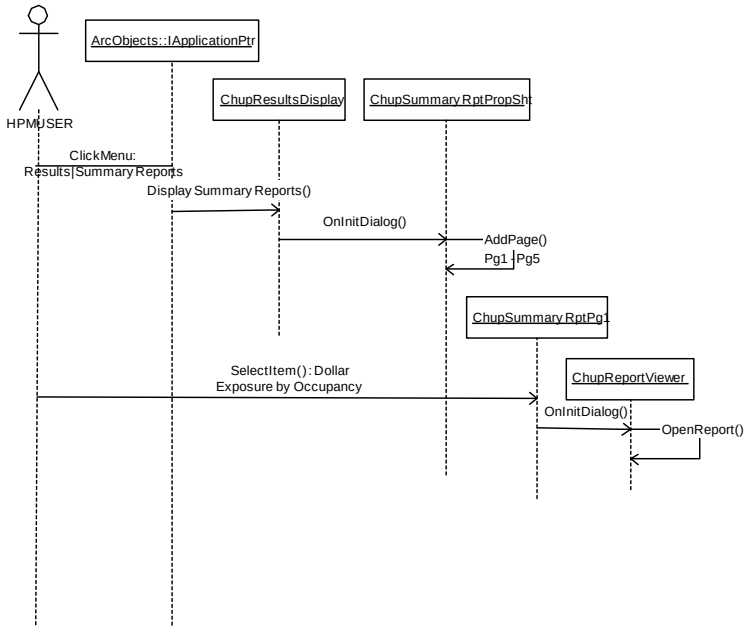

Figure 96. Sequence Diagram for Displaying a Report

3.3 API Design Description

This section describes the programming interfaces to the Hurricane Model for use by the HAZUS Application Shell.

3.3.1 Launching the Hurricane Model

Launching the Hurricane Model is initiated through the HAZUS-MH Application Shell by the user, through the HAZUS-MH Startup Wizard. The user chooses to open a study region. Then the user selects which study region to open and then clicks Finish to open the region. When the wizard closes, the HAZUS-MH Application Shell calls the *ChuaMap::OpenHuMapDocument* method found in the Hurricane Mapping Engine and it opens the study region. This section describes the process to launch the hurricane model.

3.3.1.1 Environment

HAZUS-MH was developed to be run inside ESRI's ArcMap software through an ArcMap map document. When a study region is created a HazusHu.mxd file is copied from the Data\hu

folder to the study region folder. Then when the HAZUS Shell calls the *OpenHuMapDocument* method, a ShellExecute command is called which opens the file in ArcMap.

3.3.1.2 Map Document and Map Template

Visual Basic for Applications (VBA) code is used to create the look and feel of HAZUS-MH. When ArcMap opens the map document, HazusHu.mxd, it uses a corresponding template (ArcGIS\Bin\Template \HazusHu.mxt) to set the up the default HAZUS menus and layers. The VBA code is located in the template document. When the HazusHu.mxd is opened, the template document is accessed and calls the *MxDocument_OpenDocument* method. The *MxDocument_OpenDocument* method updates the map document with HAZUS common menus, hurricane specific menus, and hurricane specific map layers.

Inside the *MxDocument_OpenDocument* method is a series of ESRI map document methods and hurricane model COM component calls that build the HAZUS user interface. The process is shown in Figure 97.

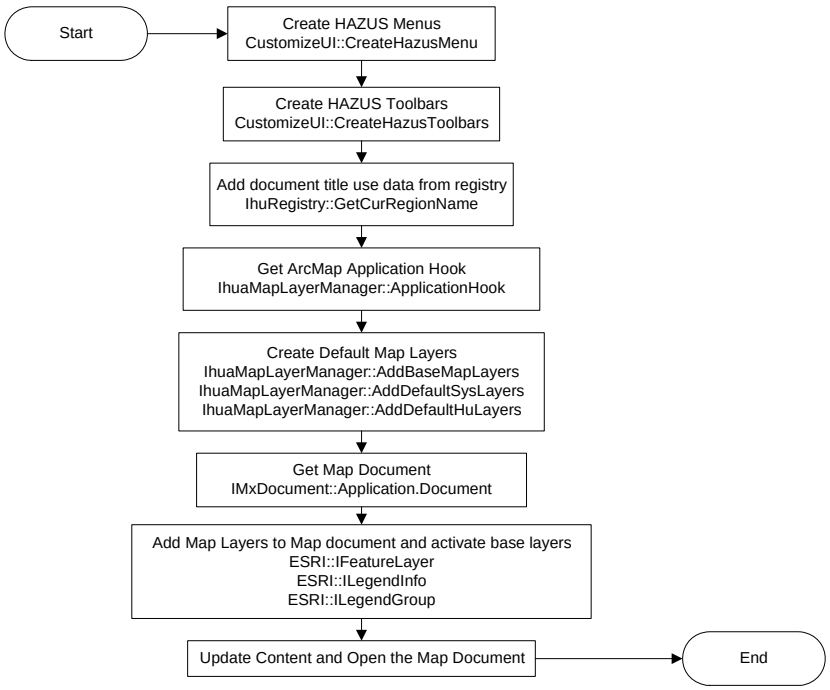

Figure 97. Creating the HAZUS-MH Map Document in MxDocument_OpenDocument()

3.3.2 Aggregating the Databases

As discussed earlier, due to MSDE size limitations, the HAZUS-MH database is split into two parts: System and Template. The hurricane model provides an interface to populate the template database with hurricane specific tables, views, and stored procedures. After the template database is populated with non-hazard specific data, the HAZUS-MH Application Shell calls the hurricane specific aggregation through the *hudDTS* COM interface in the Data Services Package (Data Layer). This section describes the sequence used by the hurricane model to populate the study region template database and create the HazusHu ArcMap document discussed in Section 3.3.1.

3.3.2.1 Overview

The study region is created and populated through method calls made by the HAZUS-MH Application Shell. These methods then run DTS Packages to create tables, views, and stored procedures in the new study region database. The same DTS Packages copy data from Microsoft Access databases (*.mdb) to the new database. Non-hazard specific data are processed first, and then the hurricane specific data are processed.

3.3.2.2 Hurricane Specific Data

Like the non-hazard specific data, the hurricane specific data are stored in a series of Microsoft Access Databases (*.mdb). The data are divided into general hurricane data and geographic specific hurricane data.

The general data are located under the Data\HU folder in the HAZUS-MH root folder. The general data are used to support user interface functionality, hurricane mapping scheme data, and study region isolated analysis data. All the data in these tables are moved to the study region database.

The geographic hurricane specific data or Census data are stored by State. The data are located in the HU folder for each State located on the State DVD data. The data contain the HU census data, terrain data, hazard map wind speed data and tree parameter data.

Table 48. Hurricane Specific Microsoft ACCESS Template Databases

Item Number	Database Name	Description
1	huTemplateGeneral.mdb	Contains non-geographical data such as building description data, report data, and mapping scheme data.
2	huTemplateAnalysis.mdb	Contains non-geographical analysis option data, building economic data, shelter data.
3	huTemplateGBS.mdb	Contains geographical data that are Census Tract specific, such as terrain data, hazard map wind speed data, and tree parameter data. Located on the State Data DVDs.

3.3.2.3 SQL Server Data Transformation Services (DTS)

Data Transformation Services Packages are used to run SQL scripts to create tables, views, and stored procedures. The same DTS packages are used to copy date from the Microsoft Access Databases (*.mdb) to the new study region database in SQL Server.

Table 49. Hurricane DTS Packages

Item Number	Database Name	Description
1	huStudyRegion.dts	Create all the hurricane specific tables, views, and stored procedures.
2	huTemplateGeneral.dts	Copies data from the huTemplateGeneral.mdb database to the non-geographical tables.
3	huTemplateAnalysis.dts	Copies data from the huTemplateAnalysis.mdb database to the non-geographical analysis tables.
4	huTemplateGBS.dts	Copies data from the huTemplateGBS.mdb database located on the State Data DVDs to the Census Tract specific tables.

3.3.2.4 Aggregation Process

Once the non-hazard specific tables (hz) are created and populated, the HAZUS-MH Application Shell calls a series of methods exposed by the *hudDTS* COM component. These methods are the *InitalPopulationOfTemplateDbase(),* the *BeginDTSPackage(BSTR bstrCDdataName)*, and the *CompPopulationOfTemplateDbase()* methods.

The *InitalPopulationOfTemplateDbase()* method runs the huStudyRegion package, the huTemplateGeneral package, and the huTemplateAnalysis package. The huStudyRegion package creates the hurricane specific tables (hu). Then the package creates relationships between the non-hazard specific tables (hz) and the hurricane specific tables (hu). The huTemplateGeneral package and the huTemplateAnalysis package then copy the data from the Access Databases to a Temp SQL Server database, then to the study region database.

At this time, no census data or geographical data have been copied to the study region database. The *BeginDTSPackage(BSTR bstrCDdataName)* is called a number of times to copy the census data for each State selected in the wizard to the study region database.

The *CompPopulationOfTemplateDbase( )* method is called to complete the aggregation of the hurricane specific tables. This method does not call a DTS Package, instead it aggregates/populates the hurricane specific building stock tables using multiple calls to the UpdateGbsUsingMappingSchemeTract(). The UpdateGbsUsingMappingSchemeTract() is a method provided by the hudGbs interface in the hudInventory COM component. This method applies the Mapping Scheme to the occupancy by census data and calculates the specific hurricane building type by census data. Once calculated, the data are copied to the HU Building Count tables, the HU Exposure tables, the HU Exposure Content tables, and the Square Footage tables.

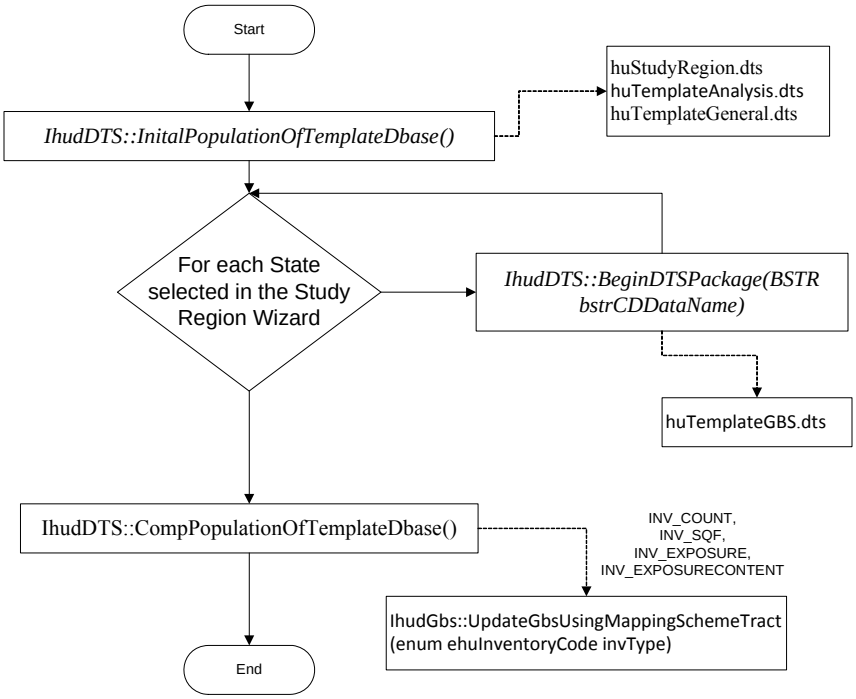

Figure 98. Data Aggregation Process

Once the aggregation of the study region database is complete, control is returned to the HAZUS-MH shell.

3.3.2.5 Map Document

The next step in creating a study region is for the HAZUS-MH shell to call a method in the Hurricane Mapping Engine call *ChuaMap::CreateHuMapDocument( )*. This method creates a HazusHu map document that is opened by the *ChuaMap::OpenHuMapDocument( )* method discussed in Section 3.3.1. This method simply uses a Shell Command to copy the Hazushu.mxt from the HAZUS-MH\Data\hu folder to the study region folder. Once complete, control is returned to the shell.

3.4 Error Handling Design

The hurricane model handles errors through message boxes (to display brief description of the error) or log files (for detailed error messages). The error handling has been implemented with error handling utility classes.

4. Detailed Design Description

This section provides a computer-generated summary of the full hurricane object model. Table 50 provides a summary of the number of interfaces, classes, etc. in the hurricane object model.

Table 50. Object Model Summary Statistics

Number of interfaces:	89
Number of classes:	107
Number of attributes:	159
Number of parameters:	2159
Number of operations:	621
Number of methods:	487
Number of dependencies:	46
Number of generalizations:	35
Number of associations:	7
Number of association ends:	14
Number of comments:	5
Number of tagged values:	5426
Number of links:	41
Number of link ends:	83
Number of collaborations:	1
Number of interactions:	1
Number of packages:	5

4.1 Data Services Package (Data Layer)

FullPath: HAZUS-MH - Hurricane Model::HU Software Static UML Model::HU_PKG::HU_DATASERVICES_PKG

Visibility: public

Classifier: ChudAnalysisOptions

FullPath: HU_DATASERVICES_PKG::ChudAnalysisOptions

Visibility: public

Attributes

1. m_pRs

Visibility: private

Multiplicity: 1

Type Expression: _RecordsetPtr

2. m_pConnection

Visibility: private

Multiplicity: 1

Type Expression: IhudDataConnection

3. m_bChanged

Visibility: private

Multiplicity: 1

Type Expression: BOOL

Operations

1. GetUserAnalysisOptions

Visibility: public

Return Type Expression: HRESULT

2. SetUserAnalysisOptions

Visibility: public

Return Type Expression: HRESULT

3. GetDefaultOptions

Visibility: public

Return Type Expression: HRESULT

4. HasChanged

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudAnnualizedLossResults

FullPath: HU_DATASERVICES_PKG::ChudAnnualizedLossResults

Visibility: public

Operations

1. GetBuildingLoss

Visibility: public

Return Type Expression: HRESULT

2. GetContentsLoss

Visibility: public

Return Type Expression: HRESULT

3. SetBuildingLoss

Visibility: public

Return Type Expression: HRESULT

4. SetContentsLoss

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudBuildingEcnomicsParameters

FullPath: HU_DATASERVICES_PKG::ChudBuildingEcnomicsParameters

Visibility: public

Classifier: ChudDamageFunctions

FullPath: HU_DATASERVICES_PKG::ChudDamageFunctions

Visibility: public

Attributes

1. m_pRs

Visibility: private

Multiplicity: 1

Type Expression: _RecordsetPtr

2. m_pCommand

Visibility: private

Multiplicity: 1

Type Expression: _CommandPtr

3. m_pConnection

Visibility: private

Multiplicity: 1

Type Expression: IhudDataConnection

Operations

1. GetBldgParameters

Visibility: public

Return Type Expression: HRESULT

2. SetBldgParameters

Visibility: public

Return Type Expression: HRESULT

3. GetDamageFunctions

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudDamageStateResults

FullPath: HU_DATASERVICES_PKG::ChudDamageStateResults

Visibility: public

Attributes

1. m_pRs

Visibility: private

Multiplicity: 1

Type Expression: _RecordsetPtr

2. m_pConnection

Visibility: private

Multiplicity: 1

Type Expression: IhudDataConnection

3. m_bCurrent

Visibility: private

Multiplicity: 1

Type Expression: BOOL

Operations

1. GetDamageResults

Visibility: public

Return Type Expression: HRESULT

2. SetDamageResults

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudDataConnection

FullPath: HU_DATASERVICES_PKG::ChudDataConnection

Visibility: private

Attributes

1. m_pConnection

Visibility: private

Multiplicity: 1

Type Expression: _ConnectionPtr

2. m_connectionStr

Visibility: private

Multiplicity: 1

Type Expression: _bstr_t

Operations

1. OpenConnection

Visibility: public

Return Type Expression: HRESULT

2. HasValidConnection

Visibility: public

Return Type Expression: BOOL

3. CloseConnection

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudDebrisParameters

FullPath: HU_DATASERVICES_PKG::ChudDebrisParameters

Visibility: public

Attributes

1. m_pRs

Visibility: private

Multiplicity: 1

Type Expression: _RecordsetPtr

2. m_pConnection

Visibility: private

Multiplicity: 1

Type Expression: IhudDataConnection

Operations

1. GetDebrisFunctions

Visibility: public

Return Type Expression: HRESULT

2. GetDebrisParameters

Visibility: public

Return Type Expression: HRESULT

3. SetDebrisParameters

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudDebrisResults

FullPath: HU_DATASERVICES_PKG::ChudDebrisResults

Visibility: public

No

Attributes

1. m_pRs

Visibility: private

Multiplicity: 1

Type Expression: _RecordsetPtr

2. m_pConnection

Visibility: private

Multiplicity: 1

Type Expression: IhudDataConnection

Operations

1. GetDebrisResults

Visibility: public

Return Type Expression: HRESULT

2. SetDebrisResults

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudDeterministicHazardResults

FullPath: HU_DATASERVICES_PKG::ChudDeterministicHazardResults

Visibility: public

Operations

1. GetWindSpeeds

Visibility: public

Return Type Expression: HRESULT

2. SetWindSpeed

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudDeterministicScenario

FullPath: HU_DATASERVICES_PKG::ChudDeterministicScenario

Visibility: public

Operations

1. GetScenarioProperties

Visibility: public

Return Type Expression: HRESULT

2. UpdateScenarioProperties

Visibility: public

Return Type Expression: HRESULT

3. GetName

Visibility: public

Return Type Expression: HRESULT

4. GetDateCreated

Visibility: public

Return Type Expression: HRESULT

5. GetWindSpeeds

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudEssentialFacilities

FullPath: HU_DATASERVICES_PKG::ChudEssentialFacilities

Visibility: public

Attributes

1. m_pRs

Visibility: private

Multiplicity: 1

Type Expression: _RecordsetPtr

2. m_pCommand

Visibility: private

Multiplicity: 1

Type Expression: _CommandPtr

3. m_pConnection

Visibility: private

Multiplicity: 1

Type Expression: IhudDataConnection

4. m_bChanged

Visibility: private

Multiplicity: 1

Type Expression: BOOL

Operations

1. GetEssentialFacilities

Visibility: public

Return Type Expression: HRESULT

2. AddNew

Visibility: public

Return Type Expression: HRESULT

3. Remove

Visibility: public

Return Type Expression: HRESULT

4. Update

Visibility: public

Return Type Expression: HRESULT

5. HasChanged

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudEssentialFacilitiesAnalysisResults

FullPath: HU_DATASERVICES_PKG::ChudEssentialFacilitiesAnalysisResults

Visibility: public

Attributes

1. m_efType

Visibility: private

Multiplicity: 1

Type Expression: ehuEssentialFacilityType

Operations

1. GetDamage

Visibility: public

Return Type Expression: HRESULT

2. GetFunctionality

Visibility: public

Return Type Expression: HRESULT

3. SetEfType

Visibility: public

Return Type Expression: HRESULT

4. SetDamage

Visibility: public

Return Type Expression: HRESULT

5. SetFunctionality

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudGbs

FullPath: HU_DATASERVICES_PKG::ChudGbs

Visibility: public

Attributes

1. m_pRs

Visibility: private

Multiplicity: 1

Type Expression: _RecordsetPtr

2. m_pCmd

Visibility: private

Multiplicity: 1

Type Expression: _CommandPtr

3. m_pConnection

Visibility: private

Multiplicity: *

Type Expression: IhudDataConnection

4. m_bChanged

Visibility: private

Multiplicity: 1

Type Expression: BOOL

Operations

1. verifyConnection

Visibility: private

Return Type Expression: bool

2. GetSquareFootage

Visibility: public

Return Type Expression: HRESULT

3. GetBuildingCount

Visibility: public

Return Type Expression: HRESULT

4. GetDollarExposure

Visibility: public

Return Type Expression: HRESULT

5. UpdateSquareFootage

Visibility: public

Return Type Expression: HRESULT

6. UpdateBuildingCount

Visibility: public

Return Type Expression: HRESULT

7. UpdateDollarExposure

Visibility: public

Return Type Expression: HRESULT

8. HasChanged

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudHazardAnalysisResults

FullPath: HU_DATASERVICES_PKG::ChudHazardAnalysisResults

Visibility: public

Attributes

1. m_pRs

Visibility: protected

Multiplicity: 1

Type Expression: _RecordsetPtr

2. m_pCommand

Visibility: protected

Multiplicity: 1

Type Expression: _CommandPtr

3. m_pConnection

Visibility: protected

Multiplicity: 1

Type Expression: IhudDataConnection

4. m_bCurrent

Visibility: private

Multiplicity: 1

Type Expression: BOOL

Operations

1. GetWindSpeeds

Visibility: public

Return Type Expression: HRESULT

2. SetWindSpeeds

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudHplf

FullPath: HU_DATASERVICES_PKG::ChudHplf

Visibility: public

Operations

1. GetHplfInventory

Return Type Expression: HRESULT

Classifier: ChudIndividualFacilitiesResults

FullPath: HU_DATASERVICES_PKG::ChudIndividualFacilitiesResults

Visibility: public

Attributes

1. m_pRs

Visibility: protected

Multiplicity: 1

Type Expression: _RecordsetPtr

2. m_pConnection

Visibility: protected

Multiplicity: 1

Type Expression: IhudDataConnection

3. m_bCurrent

Visibility: protected

Multiplicity: 1

Type Expression: BOOL

4. m_facilityType

Visibility: private

Multiplicity: 1

Operations

1. GetDamage

Visibility: public

Return Type Expression: HRESULT

2. GetFunctionality

Visibility: public

Return Type Expression: HRESULT

3. SetDamage

Visibility: public

Return Type Expression: HRESULT

4. SetFunctionality

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudInventoryClassification

FullPath: HU_DATASERVICES_PKG::ChudInventoryClassification

Visibility: public

Attributes

1. m_pRs

Visibility: private

Multiplicity: 1

Type Expression: _RecordsetPtr

2. m_pConnection

Visibility: private

Multiplicity: 1

Type Expression: IhudDataConnectionPtr

Operations

1. GetInventoryClasses

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudLossAnalysisResults

FullPath: HU_DATASERVICES_PKG::ChudLossAnalysisResults

Visibility: public

Attributes

1. m_pRs

Visibility: protected

Multiplicity: 1

Type Expression: _RecordsetPtr

2. m_pConnection

Visibility: protected

Multiplicity: 1

Type Expression: IhudDataConnection

3. m_bCurrent

Visibility: private

Multiplicity: 1

Type Expression: BOOL

Classifier: ChudLossFunctions

FullPath: HU_DATASERVICES_PKG::ChudLossFunctions

Visibility: public

Attributes

1. m_pRs

Visibility: private

Multiplicity: 1

Type Expression: _RecordsetPtr

2. m_pCommand

Visibility: private

Multiplicity: 1

Type Expression: _CommandPtr

3. m_pConnection

Visibility: private

Multiplicity: 1

Type Expression: IhudDataConnection

Operations

1. GetBldgParameters

Visibility: public

Return Type Expression: HRESULT

2. GetLossFunctions

Visibility: public

Return Type Expression: HRESULT

3. SetBldgParameters

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudMappingScheme

FullPath: HU_DATASERVICES_PKG::ChudMappingScheme

Visibility: public

Attributes

1. m_pConnection

Visibility: protected

Multiplicity: 1

Type Expression: IhudDataConnection

2. m_pRs

Visibility: protected

Multiplicity: 1

Type Expression: _RecordsetPtr

3. m_schemeName

Visibility: protected

Multiplicity: 1

Type Expression: BSTR

4. m_schemeType

Visibility: protected

Multiplicity: 1

Type Expression: ehuInventorySchemeType

5. m_stdyRegionName

Visibility: protected

Multiplicity: 1

Type Expression: BSTR

6. m_mappingSchemeType

Visibility: private

Multiplicity: 1

Type Expression: ehuInventoryMappingScheme

7. m_censusID

Visibility: private

Multiplicity: *

Type Expression: BSTR

Operations

1. GetMappingScheme

Visibility: public

Return Type Expression: HRESULT

2. UpdateMappingScheme

Visibility: public

Return Type Expression: HRESULT

3. GetName

Visibility: public

Return Type Expression: HRESULT

4. SetName

Visibility: public

Return Type Expression: HRESULT

5. GetType

Visibility: public

Return Type Expression: HRESULT

6. SetType

Visibility: public

Return Type Expression: HRESULT

7. GetStdyRegionName

Visibility: public

Return Type Expression: HRESULT

8. SetStdyRegionName

Visibility: public

Return Type Expression: HRESULT

9. AddCensus

Visibility: public

Return Type Expression: HRESULT

10. RemoveCensus

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudMappingSchemeList

FullPath: HU_DATASERVICES_PKG::ChudMappingSchemeList

Visibility: public

Attributes

1. m_type

Visibility: private

Multiplicity: 1

Type Expression: ehuInventoryMappingScheme

2. m_mappingSchemes

Visibility: private

Multiplicity: *

Type Expression: IhudMappingScheme

3. m_pConnection

Visibility: private

Multiplicity: 1

Type Expression: IhudDataConnection

Operations

1. Init

Visibility: public

Return Type Expression: HRESULT

2. Add

Visibility: public

Return Type Expression: HRESULT

3. Insert

Visibility: public

Return Type Expression: HRESULT

4. Find

Visibility: public

Return Type Expression: HRESULT

5. GetType

Visibility: public

Return Type Expression: HRESULT

6. SetType

Visibility: public

Return Type Expression: HRESULT

7. Element

Visibility: public

Return Type Expression: HRESULT

8. Count

Visibility: public

Return Type Expression: HRESULT

9. Remove

Visibility: public

Return Type Expression: HRESULT

10. RemoveAll

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudProbabilisticHazardResults

FullPath: HU_DATASERVICES_PKG::ChudProbabilisticHazardResults

Visibility: public

Operations

1. GetWindSpeed

Visibility: public

Return Type Expression: HRESULT

2. SetWindSpeed

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudProbabilisticScenario

FullPath: HU_DATASERVICES_PKG::ChudProbabilisticScenario

Visibility: public

Attributes

1. m_numYearsInStormSet

Visibility: private

Multiplicity: 1

Type Expression: unsigned long

2. m_numStorms

Visibility: private

Multiplicity: 1

Type Expression: unsigned long

3. m_pFileStream

Visibility: private

Multiplicity: *

Type Expression: CFile

Operations

1. GetScenarioProperties

Visibility: public

Return Type Expression: HRESULT

2. UpdateScenarioProperties

Visibility: public

Return Type Expression: HRESULT

3. GetName

Visibility: public

Return Type Expression: HRESULT

4. GetDateCreated

Visibility: public

Return Type Expression: HRESULT

5. OpenStormSet

Visibility: public

Return Type Expression: HRESULT

6. Close

Visibility: public

Return Type Expression: HRESULT

7. GetWindSpeeds

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudRegion

FullPath: HU_DATASERVICES_PKG::ChudRegion

Visibility: public

Operations

1. GetCensusTracts

Visibility: public

Return Type Expression: HRESULT

2. GetCensusTractsAll

Visibility: public

Return Type Expression: HRESULT

3. GetCensusBlocks

Visibility: public

Return Type Expression: HRESULT

4. GetCensusBlocksAll

Visibility: public

Return Type Expression: HRESULT

5. GetCounties

Visibility: public

Return Type Expression: HRESULT

6. GetCountiesAll

Visibility: public

Return Type Expression: HRESULT

7. GetStates

Visibility: public

Return Type Expression: HRESULT

8. GetDemographics

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudReturnPeriodLossResults

FullPath: HU_DATASERVICES_PKG::ChudReturnPeriodLossResults

Visibility: public

Attributes

1. m_returnPeriods

Visibility: private

Multiplicity: *

Type Expression: unsigned int

Operations

1. GetBuildingLoss

Visibility: public

Return Type Expression: HRESULT

2. GetContentsLoss

Visibility: public

Return Type Expression: HRESULT

3. GetReturnPeriods

Visibility: public

Return Type Expression: HRESULT

4. SetBuildingLoss

Visibility: public

Return Type Expression: HRESULT

5. SetContentsLoss

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudScenario

FullPath: HU_DATASERVICES_PKG::ChudScenario

Visibility: public

Attributes

1. m_name

Visibility: protected

Multiplicity: 1

Type Expression: _bstr_t

2. m_dateCreated

Visibility: protected

Multiplicity: 1

Type Expression: _bstr_t

3. m_pRs

Visibility: protected

Multiplicity: 1

Type Expression: _RecordsetPtr

4. m_pCommand

Visibility: protected

Multiplicity: 1

Type Expression: _RecordsetPtr

5. m_pConnection

Visibility: protected

Multiplicity: 1

Type Expression: IhudDataConnection

Operations

1. GetScenarioProperties

Visibility: public

Return Type Expression: HRESULT

2. UpdateScenarioProperties

Visibility: public

Return Type Expression: HRESULT

3. GetName

Visibility: public

Return Type Expression: HRESULT

4. GetDateCreated

Visibility: public

Return Type Expression: HRESULT

5. GetWindSpeeds

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudScenarioList

FullPath: HU_DATASERVICES_PKG::ChudScenarioList

Visibility: public

Attributes

1. m_nCurScenario

Visibility: private

Multiplicity: 1

Type Expression: unsigned long

2. m_currentScenario

Visibility: private

Multiplicity: 1

Type Expression: IhudScenario

3. m_pScenario

Visibility: private

Multiplicity: *

Type Expression: IhudScenario

4. m_pRs

Visibility: private

Multiplicity: 1

Type Expression: _RecordsetPtr

5. m_pConnection

Visibility: private

Multiplicity: 1

Operations

1. Init

Visibility: public

Return Type Expression: HRESULT

2. GetCurrentScenario

Visibility: public

Return Type Expression: HRESULT

3. Add

Visibility: public

Return Type Expression: HRESULT

4. Insert

Visibility: public

Return Type Expression: HRESULT

5. Find

Visibility: public

Return Type Expression: HRESULT

6. Element

Visibility: public

Return Type Expression: HRESULT

7. Count

Visibility: public

Return Type Expression: HRESULT

8. Remove

Visibility: public

Return Type Expression: HRESULT

9. RemoveAll

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudShelterParameters

FullPath: HU_DATASERVICES_PKG::ChudShelterParameters

Visibility: public

Classifier: ChudShelterResults

FullPath: HU_DATASERVICES_PKG::ChudShelterResults

Visibility: public

Attributes

1. m_pRs

Visibility: private

Multiplicity: 1

Type Expression: _RecordsetPtr

2. m_pDataConnection

Visibility: private

Multiplicity: 1

Type Expression: IhudDataConnection

Operations

1. GetShelterResults

Visibility: public

Return Type Expression: HRESULT

2. SetShelterResults

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudTerrain

FullPath: HU_DATASERVICES_PKG::ChudTerrain

Visibility: public

Attributes

1. m_pRs

Visibility: private

Multiplicity: 1

Type Expression: _RecordsetPtr

2. m_pCommand

Visibility: private

Multiplicity: 1

Type Expression: _CommandPtr

3. m_pConnection

Visibility: private

Multiplicity: 1

4. m_bChanged

Visibility: private

Multiplicity: 1

Operations

1. GetTerrain

Visibility: public

Return Type Expression: HRESULT

2. GetTerrain

Visibility: public

Return Type Expression: HRESULT

3. UpdateTerrain

Visibility: public

Return Type Expression: HRESULT

4. UpdateTerrain

Visibility: public

Return Type Expression: HRESULT

5. HasChanged

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudTransportationSystems

FullPath: HU_DATASERVICES_PKG::ChudTransportationSystems

Visibility: public

Operations

1. GetTransportationSystemsInventory

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudUserDefinedAnalysisResults

FullPath: HU_DATASERVICES_PKG::ChudUserDefinedAnalysisResults

Visibility: public

Operations

1. GetDamage

Visibility: public

Return Type Expression: HRESULT

2. GetFunctionality

Visibility: public

Return Type Expression: HRESULT

3. SetDamage

Visibility: public

Return Type Expression: HRESULT

4. SetFunctionality

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudUserDefinedFacilities

FullPath: HU_DATASERVICES_PKG::ChudUserDefinedFacilities

Visibility: public

Attributes

1. m_pRs

Visibility: private

Multiplicity: 1

Type Expression: _RecordsetPtr

2. m_pCommand

Visibility: private

Multiplicity: 1

Type Expression: _CommandPtr

3. m_pConnection

Visibility: private

Multiplicity: 1

Type Expression: IhudDataConnection

4. m_bChanged

Visibility: private

Multiplicity: 1

Type Expression: BOOL

Operations

1. GetUserDefinedFacilities

Visibility: public

Return Type Expression: HRESULT

2. AddNew

Visibility: public

Return Type Expression: HRESULT

3. Remove

Visibility: public

Return Type Expression: HRESULT

4. Update

Visibility: public

Return Type Expression: HRESULT

5. HasChanged

Visibility: public

Return Type Expression: HRESULT

Classifier: ChudUtilitySystems

FullPath: HU_DATASERVICES_PKG::ChudUtilitySystems

Visibility: public

Operations

1. GetUtilitySystemsInventory

Visibility: public

Return Type Expression: HRESULT

Interface: IhudAnalysisOptions

FullPath: HU_DATASERVICES_PKG::IhudAnalysisOptions

Visibility: public

Operations

1. GetUserAnalysisOptions

Visibility: public

Return Type Expression: HRESULT

2. SetUserAnalysisOptions

Visibility: public

Return Type Expression: HRESULT

3. GetDefaultOptions

Visibility: public

Return Type Expression: HRESULT

4. HasChanged

Visibility: public

Return Type Expression: HRESULT

Interface: IhudAnnualizedLossResults

FullPath: HU_DATASERVICES_PKG::IhudAnnualizedLossResults

Visibility: public

Operations

1. GetBuildingLoss

Visibility: public

Return Type Expression: HRESULT

2. GetContentsLoss

Visibility: public

Return Type Expression: HRESULT

3. SetBuildingLoss

Visibility: public

Return Type Expression: HRESULT

4. SetContentsLoss

Visibility: public

Return Type Expression: HRESULT

Interface: IhudBuildingEconomicParameters

FullPath: HU_DATASERVICES_PKG::IhudBuildingEconomicParameters

Visibility: public

Interface: IhudDamageFunctions

FullPath: HU_DATASERVICES_PKG::IhudDamageFunctions

Visibility: public

Operations

1. GetBldgParameters

Visibility: public

Return Type Expression: HRESULT

2. GetDamageFunctions

Visibility: public

Return Type Expression: HRESULT

3. SetBldgParameters

Visibility: public

Return Type Expression: HRESULT

Interface: IhudDamageStateResults

FullPath: HU_DATASERVICES_PKG::IhudDamageStateResults

Visibility: public

Interface: IhudDataConnection

FullPath: HU_DATASERVICES_PKG::IhudDataConnection

Visibility: public

Operations

1. OpenConnection

Visibility: public

Return Type Expression: HRESULT

2. CloseConnection

Visibility: public

Return Type Expression: HRESULT

3. HasValidConnection

Visibility: public

Return Type Expression: BOOL

Interface: IhudDebrisParameters

FullPath: HU_DATASERVICES_PKG::IhudDebrisParameters

Visibility: public

Operations

1. GetDebrisFunctions

Visibility: public

Return Type Expression: HRESULT

2. GetDebrisParameters

Visibility: public

Return Type Expression: HRESULT

3. SetDebrisParameters

Visibility: public

Return Type Expression: HRESULT

Interface: IhudDebrisResults

FullPath: HU_DATASERVICES_PKG::IhudDebrisResults

Visibility: public

Operations

1. GetDebrisResults

Visibility: public

Return Type Expression: HRESULT

2. SetDebrisResults

Visibility: public

Return Type Expression: HRESULT

Interface: IhudDeterministicHazardResults

FullPath: HU_DATASERVICES_PKG::IhudDeterministicHazardResults

Visibility: public

Operations

1. GetWindSpeeds

Visibility: public

Return Type Expression: HRESULT

2. SetWindSpeed

Visibility: public

Return Type Expression: HRESULT

Interface: IhudDeterministicScenario

FullPath: HU_DATASERVICES_PKG::IhudDeterministicScenario

Visibility: public

Operations

1. GetScenarioProperties

Visibility: public

Return Type Expression: HRESULT

2. UpdateScenarioProperties

Visibility: public

Return Type Expression: HRESULT

3. GetName

Visibility: public

Return Type Expression: HRESULT

4. GetDateCreated

Visibility: public

Return Type Expression: HRESULT

Interface: IhudEssentialFacilities

FullPath: HU_DATASERVICES_PKG::IhudEssentialFacilities

Visibility: public

Operations

1. GetEssentialFacilities

Visibility: public

Return Type Expression: HRESULT

2. AddNew

Visibility: public

Return Type Expression: HRESULT

3. Remove

Visibility: public

Return Type Expression: HRESULT

4. Update

Visibility: public

Return Type Expression: HRESULT

5. HasChanged

Visibility: public

Return Type Expression: HRESULT

Interface: IhudEssentialFacilitiesResults

FullPath: HU_DATASERVICES_PKG::IhudEssentialFacilitiesResults

Visibility: public

Operations

1. GetDamage

Visibility: public

Return Type Expression: HRESULT

2. GetFunctionality

Visibility: public

Return Type Expression: HRESULT

3. SetEfType

Visibility: public

Return Type Expression: HRESULT

Interface: IhudGbs

FullPath: HU_DATASERVICES_PKG::IhudGbs

Visibility: public

Operations

1. GetSquareFootage

Visibility: public

Return Type Expression: HRESULT

2. GetBuildingCount

Visibility: public

Return Type Expression: HRESULT

3. GetDollarExposure

Visibility: public

Return Type Expression: HRESULT

4. UpdateSquareFootage

Visibility: public

Return Type Expression: HRESULT

5. UpdateBuildingCount

Visibility: public

Return Type Expression: HRESULT

6. UpdateDollarExposure

Visibility: public

Return Type Expression: HRESULT

Interface: IhudHazardResults

FullPath: HU_DATASERVICES_PKG::IhudHazardResults

Visibility: public

Interface: IhudHplf

FullPath: HU_DATASERVICES_PKG::IhudHplf

Visibility: public

Interface: IhudIndividualFacilitiesResults

FullPath: HU_DATASERVICES_PKG::IhudIndividualFacilitiesResults

Visibility: public

Operations

1. GetDamage

Visibility: public

Return Type Expression: HRESULT

2. GetFunctionality

Visibility: public

Return Type Expression: HRESULT

Interface: IhudInventoryClassification

FullPath: HU_DATASERVICES_PKG::IhudInventoryClassification

Visibility: public

Operations

1. GetInventoryClasses

Visibility: public

Return Type Expression: HRESULT

Interface: IhudLossAnalysisResults

FullPath: HU_DATASERVICES_PKG::IhudLossAnalysisResults

Visibility: public

Interface: IhudLossFunctions

FullPath: HU_DATASERVICES_PKG::IhudLossFunctions

Visibility: public

Operations

1. GetBldgParameters

Visibility: public

Return Type Expression: HRESULT

2. GetLossFunctions

Return Type Expression: HRESULT

3. SetBldgParameters

Visibility: public

Return Type Expression: HRESULT

Interface: IhudMappingScheme

FullPath: HU_DATASERVICES_PKG::IhudMappingScheme

Visibility: public

Operations

1. GetMappingScheme

Visibility: public

Return Type Expression: HRESULT

2. UpdateMappingScheme

Visibility: public

Return Type Expression: HRESULT

3. GetName

Visibility: public

Return Type Expression: HRESULT

4. SetName

Visibility: public

Return Type Expression: HRESULT

5. GetType

Visibility: public

Return Type Expression: HRESULT

6. SetType

Visibility: public

Return Type Expression: HRESULT

7. GetStdyRegionName

Visibility: public

Return Type Expression: HRESULT

8. SetStdyRegionName

Visibility: public

Return Type Expression: HRESULT

Interface: IhudMappingSchemeList

FullPath: HU_DATASERVICES_PKG::IhudMappingSchemeList

Visibility: public

Operations

1. Init

Visibility: public

Return Type Expression: HRESULT

2. Add

Visibility: public

Return Type Expression: HRESULT

3. Insert

Visibility: public

Return Type Expression: HRESULT

4. Find

Visibility: public

Return Type Expression: HRESULT

5. GetType

Visibility: public

Return Type Expression: HRESULT

6. SetType

Visibility: public

Return Type Expression: ehuInventoryMappingScheme

7. Element

Visibility: public

Return Type Expression: HRESULT

8. Count

Visibility: public

Return Type Expression: HRESULT

9. Remove

Visibility: public

Return Type Expression: HRESULT

10. RemoveAll

Visibility: public

Return Type Expression: HRESULT

Interface: IhudProbabilisticHazardResults

FullPath: HU_DATASERVICES_PKG::IhudProbabilisticHazardResults

Visibility: public

Interface: IhudProbabilisticScenario

FullPath: HU_DATASERVICES_PKG::IhudProbabilisticScenario

Visibility: public

Operations

1. GetScenarioProperties

Visibility: public

Return Type Expression: HRESULT

2. UpdateScenarioProperties

Visibility: public

Return Type Expression: HRESULT

3. GetName

Visibility: public

Return Type Expression: HRESULT

4. GetDateCreated

Visibility: public

Return Type Expression: HRESULT

Interface: IhudRegion

FullPath: HU_DATASERVICES_PKG::IhudRegion

Visibility: public

Operations

1. GetCensusTracts

Visibility: public

Return Type Expression: HRESULT

2. GetCensusBlocks

Visibility: public

Return Type Expression: HRESULT

3. GetCounties

Visibility: public

Return Type Expression: HRESULT

4. GetStates

Visibility: public

Return Type Expression: HRESULT

5. GetCensusBlocksAll

Visibility: public

Return Type Expression: HRESULT

6. GetCensusTractsAll

Visibility: public

Return Type Expression: HRESULT

7. GetCountiesAll

Visibility: public

Return Type Expression: HRESULT

Interface: IhudReturnPeriodLossResults

FullPath: HU_DATASERVICES_PKG::IhudReturnPeriodLossResults

Visibility: public

Interface: IhudScenario

FullPath: HU_DATASERVICES_PKG::IhudScenario

Visibility: public

Operations

1. GetScenarioProperties

Visibility: public

Return Type Expression: HRESULT

2. UpdateScenarioProperties

Visibility: public

Return Type Expression: HRESULT

3. GetName

Visibility: public

Return Type Expression: HRESULT

4. GetDateCreated

Visibility: public

Return Type Expression: HRESULT

Interface: IhudScenarioList

FullPath: HU_DATASERVICES_PKG::IhudScenarioList

Visibility: public

Operations

1. Init

Visibility: public

Return Type Expression: HRESULT

2. GetCurrentScenario

Visibility: public

Return Type Expression: HRESULT

3. Add

Visibility: public

Return Type Expression: HRESULT

4. Insert

Visibility: public

Return Type Expression: HRESULT

5. Find

Visibility: public

Return Type Expression: HRESULT

6. Element

Visibility: public

Return Type Expression: HRESULT

7. Count

Visibility: public

Return Type Expression: HRESULT

8. Remove

Visibility: public

Return Type Expression: HRESULT

9. RemoveAll

Visibility: public

Return Type Expression: HRESULT

Interface: IhudShelterParameters

FullPath: HU_DATASERVICES_PKG::IhudShelterParameters

Visibility: public

Interface: IhudShelterResults

FullPath: HU_DATASERVICES_PKG::IhudShelterResults

Visibility: public

Operations

1. GetShelterResults

Visibility: public

Return Type Expression: HRESULT

2. SetShelterResults

Visibility: public

Return Type Expression: HRESULT

Interface: IhudTerrain

FullPath: HU_DATASERVICES_PKG::IhudTerrain

Visibility: public

Operations

1. GetTerrain

Visibility: public

Return Type Expression: HRESULT

2. UpdateTerrain

Visibility: public

Return Type Expression: HRESULT

Interface: IhudTransportationSystems

FullPath: HU_DATASERVICES_PKG::IhudTransportationSystems

Visibility: public

Interface: IhudUserDefinedFacilities

FullPath: HU_DATASERVICES_PKG::IhudUserDefinedFacilities

Visibility: public

Operations

1. GetUserDefinedFacilities

Visibility: public

Return Type Expression: HRESULT

2. AddNew

Visibility: public

Return Type Expression: HRESULT

3. Remove

Visibility: public

Return Type Expression: HRESULT

4. Update

Visibility: public

Return Type Expression: HRESULT

Interface: IhudUserDefinedResults

FullPath: HU_DATASERVICES_PKG::IhudUserDefinedResults

Visibility: public

Operations

1. GetDamage

Visibility: public

Return Type Expression: HRESULT

2. GetFunctionality

Visibility: public

Return Type Expression: HRESULT

Interface: IhudUtilitySystems

FullPath: HU_DATASERVICES_PKG::IhudUtilitySystems

Visibility: public

Operations

1. GetUtilitySystems

Visibility: public

Return Type Expression: HRESULT

4.2 Calculation Engine Package (Application Layer)

FullPath: HAZUS-MH - Hurricane Model::HU Software Static UML Model::HU_PKG::HU_CALCULATIONENGINE_PKG

Visibility: public

Classifier: ChuaAnalysis

FullPath: HU_CALCULATIONENGINE_PKG::ChuaAnalysis

Visibility: public

Attributes

1. m_analysisFunctions

Visibility: private

Multiplicity: 1

Type Expression: IhuaAnalysisFunctions

Operations

1. RunAnalysis

Visibility: public

Return Type Expression: HRESULT

2. SaveAnalysisResults

Visibility: public

Return Type Expression: HRESULT

Classifier: ChuaAnalysisFunction

FullPath: HU_CALCULATIONENGINE_PKG::ChuaAnalysisFunction

Visibility: public

Attributes

1. m_functionType

Visibility: private

Multiplicity: 1

Type Expression: ehuAnalysisFunctionType

2. m_schemeID

Visibility: private

Multiplicity: 1

Type Expression: unsigned long

3. m_terrainID

Visibility: private

Multiplicity: 1

Type Expression: unsigned long

4. m_InvID

Visibility: private

Multiplicity: 1

Type Expression: unsigned long

5. m_values

Visibility: private

Multiplicity: *

Type Expression: unsigned short

Operations

1. SetFunctionType

Visibility: public

Return Type Expression: HRESULT

2. SetInvTypeID

Visibility: public

Return Type Expression: HRESULT

3. SetSchemeID

Visibility: public

Return Type Expression: HRESULT

4. SetTerrainID

Visibility: public

Return Type Expression: HRESULT

5. SetValues

Visibility: public

Return Type Expression: HRESULT

6. GetFunctionType

Visibility: public

Return Type Expression: HRESULT

7. GetInvTypeID

Visibility: public

Return Type Expression: HRESULT

8. GetSchemeID

Visibility: public

Return Type Expression: HRESULT

9. GetTerrainID

Visibility: public

Return Type Expression: HRESULT

10. GetValues

Visibility: public

Return Type Expression: HRESULT

Classifier: ChuaAnalysisFunctions

FullPath: HU_CALCULATIONENGINE_PKG::ChuaAnalysisFunctions

Visibility: public

Attributes

1. m_pConnection

Visibility: private

Multiplicity: 1

Type Expression: IhudDataConnection

2. m_pRs

Visibility: private

Multiplicity: 1

Type Expression: _RecordsetPtr

3. m_analysisFunction

Visibility: private

Multiplicity: *

Type Expression: IhuaAnalysisFunction

4. m_analysisFuncHashTbl

Visibility: private

Multiplicity: 1

Type Expression: map<object>

Operations

1. AggAnalysisFuncForGBSbySBT

Visibility: public

Return Type Expression: HRESULT

2. AggAnalysisFuncForGBSbySOcc

Visibility: public

Return Type Expression: HRESULT

3. AggrAnalysisFuncForEf

Visibility: public

Return Type Expression: HRESULT

4. AggrAnalysisFuncForUdf

Visibility: public

Return Type Expression: HRESULT

5. GetGBSAnalysisFuncbySBT

Visibility: public

Return Type Expression: HRESULT

6. GetGBSAnalysisFuncbySOcc

Visibility: public

Return Type Expression: HRESULT

7. GetEfAnalysisFunction

Visibility: public

Return Type Expression: HRESULT

8. GetUdfAnalysisFunction

Visibility: public

Return Type Expression: HRESULT

9. SetupHashTable

Visibility: private

Return Type Expression: HRESULT

10. GetMappingSchemesInCurRegion

Visibility: private

Return Type Expression: HRESULT

11. GetMappingScheme

Return Type Expression: HRESULT

12. GetCensusData

Visibility: private

Return Type Expression: HRESULT

13. GetTerrainData

Visibility: private

Return Type Expression: HRESULT

Classifier: ChuaDeterministicAnalysis

FullPath: HU_CALCULATIONENGINE_PKG::ChuaDeterministicAnalysis

Visibility: public

Operations

1. RunAnalysis

Visibility: public

Return Type Expression: HRESULT

2. SaveAnalysisResults

Visibility: public

Return Type Expression: HRESULT

3. AggrAnalysisFuncForEf

Visibility: private

Return Type Expression: HRESULT

4. AggrAnalysisFuncForGBS

Visibility: private

Return Type Expression: HRESULT

5. AggrAnalysisFuncForUdf

Visibility: private

Return Type Expression: HRESULT

6. GetAnalysisOptions

Visibility: private

Return Type Expression: HRESULT

7. GetAnalysisFunctions

Visibility: private

Return Type Expression: HRESULT

8. GetCurRegionCensusData

Visibility: private

Return Type Expression: HRESULT

9. GetEfInventoryData

Visibility: private

Return Type Expression: HRESULT

10. GetGBSDollarExposure

Visibility: private

Return Type Expression: HRESULT

11. GetMappingSchemesList

Visibility: private

Return Type Expression: HRESULT

12. GetTerrainData

Visibility: private

Return Type Expression: HRESULT

13. GetUdfInventoryData

Visibility: private

Return Type Expression: HRESULT

14. GetWindSpeeds

Visibility: private

Return Type Expression: HRESULT

15. InterpolateAnalysisFunctions

Visibility: private

Return Type Expression: HRESULT

Classifier: ChuaProbabilisticAnalysis

FullPath: HU_CALCULATIONENGINE_PKG::ChuaProbabilisticAnalysis

Visibility: public

Operations

1. RunAnalysis

Visibility: public

Return Type Expression: HRESULT

2. SaveAnalysisResults

Visibility: public

Return Type Expression: HRESULT

3. AggrAnalysisFuncForEf

Visibility: public

Return Type Expression: HRESULT

4. AggrAnalysisFuncForGBS

Visibility: public

Return Type Expression: HRESULT

5. AggrAnalysisFuncForUdf

Visibility: public

Return Type Expression: HRESULT

6. GetAnalysisFunctions

Visibility: private

Return Type Expression: HRESULT

7. GetAnalysisOptions

Visibility: private

Return Type Expression: HRESULT

8. GetCurRegionCensusData

Visibility: private

Return Type Expression: HRESULT

9. GetEfInventoryData

Visibility: private

Return Type Expression: HRESULT

10. GetGBSDollarExposure

Visibility: private

Return Type Expression: HRESULT

11. GetMappingSchemesList

Visibility: private

Return Type Expression: HRESULT

12. GetTerrainData

Visibility: private

Return Type Expression: HRESULT

13. GetUdfInventoryData

Visibility: private

Return Type Expression: HRESULT

14. GetWindSpeeds

Visibility: private

Return Type Expression: HRESULT

15. InterpolateAnalysisFunctions

Visibility: private

Return Type Expression: HRESULT

Interface: IhuaAnalysis

FullPath: HU_CALCULATIONENGINE_PKG::IhuaAnalysis

Visibility: public

Operations

1. RunAnalysis

Visibility: public

Return Type Expression: HRESULT

Interface: IhuaAnalysisFunction

FullPath: HU_CALCULATIONENGINE_PKG::IhuaAnalysisFunction

Visibility: public

Operations

1. SetFunctionType

Visibility: public

Return Type Expression: HRESULT

2. SetInvTypeID

Visibility: public

Return Type Expression: HRESULT

3. SetSchemeID

Visibility: public

Return Type Expression: HRESULT

4. SetTerrainID

Visibility: public

Return Type Expression: HRESULT

5. SetValues

Visibility: public

Return Type Expression: HRESULT

6. GetFunctionType

Visibility: public

Return Type Expression: HRESULT

7. GetInvTypeID

Visibility: public

Return Type Expression: HRESULT

8. GetSchemeID

Visibility: public

Return Type Expression: HRESULT

9. GetTerrainID

Visibility: public

Return Type Expression: HRESULT

Interface: IhuaAnalysisFunctions

FullPath: HU_CALCULATIONENGINE_PKG::IhuaAnalysisFunctions

Visibility: public

Operations

1. AggregateAnalysisFunctionsbySBT

Visibility: public

Return Type Expression: HRESULT

2. AggregateAnalysisFunctionsbySOcc

Visibility: public

Return Type Expression: HRESULT

3. SetupHashTable

Visibility: public

Return Type Expression: HRESULT

4. GetAnalysisFunctionbySBT

Visibility: public

Return Type Expression: HRESULT

5. GetAnalysisFunctionbySOcc

Visibility: public

Return Type Expression: HRESULT

Interface: IhuaDeterminsiticAnalysis

FullPath: HU_CALCULATIONENGINE_PKG::IhuaDeterminsiticAnalysis

Visibility: public

Operations

1. RunAnalysis

Visibility: public

Return Type Expression: HRESULT

Interface: IhuaProbabilisticAnalysis

FullPath: HU_CALCULATIONENGINE_PKG::IhuaProbabilisticAnalysis

Visibility: public

Operations

1. RunAnalysis

Visibility: public

Return Type Expression: HRESULT

Interface: IWindField

FullPath: HU_CALCULATIONENGINE_PKG::IWindField

Visibility: public

Operations

1. Set_FilePath

Visibility: public

Return Type Expression: HRESULT

2. Set_nTract

Visibility: public

Return Type Expression: HRESULT

3. Set_nPoints

Visibility: public

Return Type Expression: HRESULT

4. Set_LatLong

Visibility: public

Return Type Expression: HRESULT

5. Set_Flag

Visibility: public

Return Type Expression: HRESULT

6. Set_Time

Visibility: public

Return Type Expression: HRESULT

7. Translation_Speeds

Visibility: public

Return Type Expression: HRESULT

8. CalcWindSpeeds

Visibility: public

Return Type Expression: HRESULT

9. GetPeakGust

Visibility: public

Return Type Expression: HRESULT

10. GetSustainedWinds

Visibility: public

Return Type Expression: HRESULT

4.3 Work Flow Package (Application Layer)

FullPath: HU_PKG::HU_WORKFLOW_PKG

Visibility: public

Classifier: ChuwAnalysisParameters

FullPath: HU_WORKFLOW_PKG::ChuwAnalysisParameters

Visibility: public

Attributes

1. m_pRs

Visibility: private

Multiplicity: 1

Type Expression: _RecordsetPtr

Operations

1. GetTerrain

Visibility: public

Return Type Expression: HRESULT

2. GetTerrain

Visibility: public

Return Type Expression: HRESULT

3. UpdateTerrain

Visibility: public

Return Type Expression: HRESULT

4. UpdateTerrain

Visibility: public

Return Type Expression: HRESULT

5. GetBldgParams

Visibility: public

Return Type Expression: HRESULT

6. SetBldgParams

Visibility: public

Return Type Expression: HRESULT

7. GetLossFunctions

Visibility: public

Return Type Expression: HRESULT

8. GetDamageFunctions

Visibility: public

Return Type Expression: HRESULT

9. GetDebrisParameters

Visibility: public

Return Type Expression: HRESULT

10. GetShelterParameters

Visibility: public

Return Type Expression: HRESULT

11. GetRestorationFunctions

Visibility: public

Return Type Expression: HRESULT

12. GetBuildingEconomicParameters

Visibility: public

Return Type Expression: HRESULT

13. GetUserDefinedAnalysisOptions

Visibility: public

Return Type Expression: HRESULT

14. GetDefaultAnalysisOptions

Visibility: public

Return Type Expression: HRESULT

15. UpdateAnalysisOptions

Visibility: public

Return Type Expression: HRESULT

16. RunAnalysis

Visibility: public

Return Type Expression: HRESULT

Classifier: ChuwDebrisResults

FullPath: HU_WORKFLOW_PKG::ChuwDebrisResults

Visibility: public

Attributes

1. m_bCurrent

Visibility: private

Multiplicity: 1

Type Expression: BOOL

Operations

1. GetDebrisResults

Visibility: public

Return Type Expression: HRESULT

2. SetDebrisResults

Visibility: public

Return Type Expression: HRESULT

3. IsCurrent

Visibility: public

Return Type Expression: HRESULT

Classifier: ChuwEssentialFacilities

FullPath: HU_WORKFLOW_PKG::ChuwEssentialFacilities

Visibility: public

Attributes

1. m_pRs

Visibility: private

Multiplicity: 1

Type Expression: _RecordsetPtr

2. m_bChanged

Visibility: private

Multiplicity: 1

Type Expression: BOOL

Operations

1. GetEssentialFacilities

Visibility: public

Return Type Expression: HRESULT

2. AddNew

Visibility: public

Return Type Expression: HRESULT

3. Remove

Visibility: public

Return Type Expression: HRESULT

4. Update

Visibility: public

Return Type Expression: HRESULT

5. HasChanged

Visibility: public

Return Type Expression: HRESULT

6. VerifyConnection

Visibility: public

Return Type Expression: HRESULT

7. GetMappingScheme

Visibility: public

Return Type Expression: HRESULT

Classifier: ChuwGbs

FullPath: HU_WORKFLOW_PKG::ChuwGbs

Visibility: public

Attributes

1. m_pRs

Visibility: private

Multiplicity: 1

Type Expression: _RecordsetPtr

2. m_bChanged

Visibility: private

Multiplicity: 1

Type Expression: BOOL

3. m_bCurrent

Visibility: protected

Multiplicity: 1

Type Expression: BOOL

Operations

1. GetSquareFootage

Visibility: public

Return Type Expression: HRESULT

2. GetBuildingCount

Visibility: public

Return Type Expression: HRESULT

3. GetDollarExposure

Visibility: public

Return Type Expression: HRESULT

4. GetValuationParamters

Visibility: public

Return Type Expression: HRESULT

5. GetMappingScheme

Visibility: public

Return Type Expression: HRESULT

6. UpdateSquareFootage

Visibility: public

Return Type Expression: HRESULT

7. UpdateBuildingCount

Visibility: public

Return Type Expression: HRESULT

8. UpdateDollarExposure

Visibility: public

Return Type Expression: HRESULT

9. UpdateMappingScheme

Visibility: public

Return Type Expression: HRESULT

10. RecomputeDollarExposure

Visibility: public

Return Type Expression: HRESULT

11. IsCurrent

Visibility: public

Return Type Expression: HRESULT

Classifier: ChuwGbsResults

FullPath: HU_WORKFLOW_PKG::ChuwGbsResults

Visibility: public

Attributes

1. m_returnPeriods

Visibility: private

Multiplicity: *

Type Expression: unsigned int

2. m_bCurrent

Visibility: private

Multiplicity: 1

Type Expression: BOOL

Operations

1. GetAnalysisType

Visibility: public

Return Type Expression: HRESULT

2. SetAnalysisType

Visibility: public

Return Type Expression: HRESULT

3. GetReturnPeriods

Visibility: public

Return Type Expression: HRESULT

4. GetBuildingLoss

Visibility: public

Return Type Expression: HRESULT

5. GetContentsLoss

Visibility: public

Return Type Expression: HRESULT

6. SetBuildingLoss

Visibility: public

Return Type Expression: HRESULT

7. SetContentsLoss

Visibility: public

Return Type Expression: HRESULT

8. GetDamageStateResults

Visibility: public

Return Type Expression: HRESULT

9. SetDamageStateResults

Visibility: public

Return Type Expression: HRESULT

Classifier: ChuwHazardResults

FullPath: HU_WORKFLOW_PKG::ChuwHazardResults

Visibility: public

Attributes

1. m_bCurrent

Visibility: private

Multiplicity: 1

Type Expression: BOOL

Operations

1. GetWindSpeeds

Visibility: public

Return Type Expression: HRESULT

2. SetWindSpeeds

Visibility: public

Return Type Expression: HRESULT

3. IsCurrent

Visibility: public

Return Type Expression: HRESULT

Classifier: ChuwHazMaterials

FullPath: HU_WORKFLOW_PKG::ChuwHazMaterials

Visibility: public

Operations

1. GetHazMatInventory

Visibility: public

Return Type Expression: HRESULT

Classifier: ChuwHplf

FullPath: HU_WORKFLOW_PKG::ChuwHplf

Visibility: public

Operations

1. GetHplfInventory

Visibility: public

Return Type Expression: HRESULT

Classifier: ChuwIndividualFacilitiesResults

FullPath: HU_WORKFLOW_PKG::ChuwIndividualFacilitiesResults

Visibility: public

Attributes

1. m_bCurrent

Visibility: protected

Multiplicity: 1

Type Expression: BOOL

Operations

1. GetDamage

Visibility: public

Return Type Expression: HRESULT

2. GetFunctionality

Visibility: public

Return Type Expression: HRESULT

3. SetDamage

Visibility: public

Return Type Expression: HRESULT

4. SetFunctionality

Visibility: public

Return Type Expression: HRESULT

5. IsCurrent

Visibility: public

Return Type Expression: HRESULT

Classifier: ChuwInventoryClassification

FullPath: HU_WORKFLOW_PKG::ChuwInventoryClassification

Visibility: public

Attributes

1. m_pRs

Visibility: private

Multiplicity: 1

Type Expression: _RecordsetPtr

Operations

1. GetInventoryClasses

Visibility: public

Return Type Expression: HRESULT

Classifier: ChuwRegion

FullPath: HU_WORKFLOW_PKG::ChuwRegion

Visibility: public

Operations

1. GetCensusTracts

Visibility: public

Return Type Expression: HRESULT

2. GetCensusBlocks

Visibility: public

Return Type Expression: HRESULT

3. GetCounties

Visibility: public

Return Type Expression: HRESULT

4. GetStates

Visibility: public

Return Type Expression: HRESULT

5. GetStudyRegionName

Visibility: public

Return Type Expression: HRESULT

6. GetRegionProperties

Visibility: public

Return Type Expression: HRESULT

7. GetDemographics

Visibility: public

Return Type Expression: HRESULT

Classifier: ChuwScenarioList

FullPath: HU_WORKFLOW_PKG::ChuwScenarioList

Visibility: public

Attributes

1. m_nScenarios

Visibility: private

Multiplicity: 1

Type Expression: unsigned long

2. m_nCurScenario

Visibility: private

Multiplicity: 1

Type Expression: unsigned long

3. m_pRs

Visibility: private

Multiplicity: 1

Type Expression: _RecordsetPtr

Operations

1. GetScenarioList

Visibility: public

Return Type Expression: HRESULT

2. GetScenario

Visibility: public

Return Type Expression: HRESULT

3. GetCurrentScenario

Visibility: public

Return Type Expression: HRESULT

4. GetCurScenarioType

Visibility: public

Return Type Expression: HRESULT

5. SetCurScenarioType

Visibility: public

Return Type Expression: HRESULT

6. GetNumScenarios

Visibility: public

Return Type Expression: HRESULT

7. UpdateScenario

Visibility: public

Return Type Expression: HRESULT

8. GetDeterministicProperties

Visibility: public

Return Type Expression: HRESULT

9. RunWindModel

Visibility: public

Return Type Expression: HRESULT

10. ValidateDeterministicStorm

Visibility: public

Return Type Expression: HRESULT

11. AddNew

Visibility: public

Return Type Expression: HRESULT

12. Remove

Visibility: public

Return Type Expression: HRESULT

13. Empty

Visibility: public

Return Type Expression: HRESULT

Classifier: ChuwShelterResults

FullPath: HU_WORKFLOW_PKG::ChuwShelterResults

Visibility: public

Attributes

1. m_bCurrent

Visibility: protected

Multiplicity: 1

Type Expression: BOOL

Operations

1. GetShelterResults

Visibility: public

Return Type Expression: HRESULT

2. SetShelterResults

Visibility: public

Return Type Expression: HRESULT

3. IsCurrent

Visibility: public

Return Type Expression: HRESULT

Classifier: ChuwSummaryReports

FullPath: HU_WORKFLOW_PKG::ChuwSummaryReports

Visibility: public

Operations

1. DisplaySummaryReports

Visibility: public

Return Type Expression: HRESULT

Classifier: ChuwTransportationSystems

FullPath: HU_WORKFLOW_PKG::ChuwTransportationSystems

Visibility: public

Operations

1. GetTransportationSystemsInventory

Visibility: public

Return Type Expression: HRESULT

Classifier: ChuwUserDefinedFacilities

FullPath: HU_WORKFLOW_PKG::ChuwUserDefinedFacilities

Visibility: public

Attributes

1. m_pRs

Visibility: private

Multiplicity: 1

Type Expression: _RecordsetPtr

2. m_pCommand

Visibility: private

Multiplicity: 1

Type Expression: _CommandPtr

3. m_pConnection

Visibility: private

Multiplicity: 1

Type Expression: IhudDataConnection

4. m_bChanged

Visibility: private

Multiplicity: 1

Type Expression: BOOL

Operations

1. GetUserDefinedFacilities

Visibility: public

Return Type Expression: HRESULT

2. AddNew

Visibility: public

Return Type Expression: HRESULT

3. Remove

Visibility: public

Return Type Expression: HRESULT

4. Update

Visibility: public

Return Type Expression: HRESULT

5. HasChanged

Visibility: public

Return Type Expression: HRESULT

Classifier: ChuwUtilitySystems

FullPath: HU_WORKFLOW_PKG::ChuwUtilitySystems

Visibility: public

Operations

1. GetUtilitySystemsInventory

Visibility: public

Return Type Expression: HRESULT

Interface: IhuwAnalysisParameters

FullPath: HU_WORKFLOW_PKG::IhuwAnalysisParameters

Visibility: public

Operations

1. GetTerrain

Visibility: public

Return Type Expression: HRESULT

2. UpdateTerrain

Visibility: public

Return Type Expression: HRESULT

Interface: IhuwDebrisResults

FullPath: HU_WORKFLOW_PKG::IhuwDebrisResults

Visibility: public

Operations

1. GetDebrisResults

Visibility: public

Return Type Expression: HRESULT

2. SetDebrisResults

Visibility: public

Return Type Expression: HRESULT

3. IsCurrent

Visibility: public

Return Type Expression: HRESULT

Interface: IhuwEssentialFacilities

FullPath: HU_WORKFLOW_PKG::IhuwEssentialFacilities

Visibility: public

Operations

1. GetEssentialFacilities

Visibility: public

Return Type Expression: HRESULT

2. AddNew

Visibility: public

Return Type Expression: HRESULT

3. Remove

Visibility: public

Return Type Expression: HRESULT

4. Update

Visibility: public

Return Type Expression: HRESULT

5. HasChanged

Visibility: public

Return Type Expression: HRESULT

Interface: IhuwGbs

FullPath: HU_WORKFLOW_PKG::IhuwGbs

Visibility: public

Operations

1. GetSquareFootage

Visibility: public

Return Type Expression: HRESULT

2. GetBuildingCount

Visibility: public

Return Type Expression: HRESULT

3. GetDollarExposure

Visibility: public

Return Type Expression: HRESULT

4. GetValuationParamters

Visibility: public

Return Type Expression: HRESULT

5. GetMappingScheme

Visibility: public

Return Type Expression: HRESULT

6. UpdateSquareFootage

Visibility: public

Return Type Expression: HRESULT

7. UpdateBuildingCount

Visibility: public

Return Type Expression: HRESULT

8. UpdateDollarExposure

Visibility: public

Return Type Expression: HRESULT

9. UpdateMappingScheme

Visibility: public

Return Type Expression: HRESULT

10. RecomputeDollarExposure

Visibility: public

Return Type Expression: HRESULT

Interface: IhuwGbsResults

FullPath: HU_WORKFLOW_PKG::IhuwGbsResults

Visibility: public

Operations

1. IsCurrent

Visibility: public

Return Type Expression: HRESULT

Interface: IhuwHazardResults

FullPath: HU_WORKFLOW_PKG::IhuwHazardResults

Visibility: public

Operations

1. GetWindSpeeds

Visibility: public

Return Type Expression: HRESULT

2. SetWindSpeeds

Visibility: public

Return Type Expression: HRESULT

3. IsCurrent

Visibility: public

Return Type Expression: HRESULT

Interface: IhuwHazMaterials

FullPath: HU_WORKFLOW_PKG::IhuwHazMaterials

Visibility: public

Operations

1. GetHazMatInventory

Visibility: public

Return Type Expression: HRESULT

Interface: IhuwHplf

FullPath: HU_WORKFLOW_PKG::IhuwHplf

Visibility: public

Operations

1. GetHplfInventory

Visibility: public

Return Type Expression: HRESULT

Interface: IhuwIndividualFacilitiesResults

FullPath: HU_WORKFLOW_PKG::IhuwIndividualFacilitiesResults

Visibility: public

Operations

1. GetDamage

Visibility: public

Return Type Expression: HRESULT

2. GetFunctionality

Visibility: public

Return Type Expression: HRESULT

3. IsCurrent

Visibility: public

Return Type Expression: HRESULT

Interface: IhuwInventoryClassification

FullPath: HU_WORKFLOW_PKG::IhuwInventoryClassification

Visibility: public

Operations

1. GetInventoryClasses

Visibility: public

Return Type Expression: HRESULT

Interface: IhuwRegion

FullPath: HU_WORKFLOW_PKG::IhuwRegion

Visibility: public

Operations

1. GetCensusTracts

Visibility: public

Return Type Expression: HRESULT

2. GetCensusBlocks

Visibility: public

Return Type Expression: HRESULT

3. GetCounties

Visibility: public

Return Type Expression: HRESULT

4. GetStates

Visibility: public

Return Type Expression: HRESULT

5. GetStudyRegionName

Visibility: public

Return Type Expression: HRESULT

6. GetRegionProperties

Visibility: public

Return Type Expression: HRESULT

7. GetDemographics

Visibility: public

Return Type Expression: HRESULT

Interface: IhuwScenarioList

FullPath: HU_WORKFLOW_PKG::IhuwScenarioList

Visibility: public

Operations

1. Init

Visibility: public

Return Type Expression: HRESULT

2. GetCurrentScenario

Visibility: public

Return Type Expression: HRESULT

3. Add

Visibility: public

Return Type Expression: HRESULT

4. Insert

Visibility: public

Return Type Expression: HRESULT

5. Find

Visibility: public

Return Type Expression: HRESULT

6. Element

Visibility: public

Return Type Expression: HRESULT

7. Count

Visibility: public

Return Type Expression: HRESULT

8. Remove

Visibility: public

Return Type Expression: HRESULT

9. RemoveAll

Visibility: public

Return Type Expression: HRESULT

Interface: IhuwShelterResults

FullPath: HU_WORKFLOW_PKG::IhuwShelterResults

Visibility: public

Operations

1. GetShelterResults

Visibility: public

Return Type Expression: HRESULT

2. SetShelterResults

Visibility: public

Return Type Expression: HRESULT

3. IsCurrent

Visibility: public

Return Type Expression: HRESULT

Interface: IhuwSummaryReports

FullPath: HU_WORKFLOW_PKG::IhuwSummaryReports

Visibility: public

Interface: IhuwTransportationSystems

FullPath: HU_WORKFLOW_PKG::IhuwTransportationSystems

Visibility: public

Operations

1. GetTransportationSystemsInventory

Visibility: public

Return Type Expression: HRESULT

Interface: IhuwUserDefinedFacilities

FullPath: HU_WORKFLOW_PKG::IhuwUserDefinedFacilities

Visibility: public

Operations

1. GetUserDefinedFacilities

Visibility: public

Return Type Expression: HRESULT

2. AddNew

Visibility: public

Return Type Expression: HRESULT

3. Remove

Visibility: public

Return Type Expression: HRESULT

4. Update

Visibility: public

Return Type Expression: HRESULT

Interface: IhuwUtilitySystems

FullPath: HU_WORKFLOW_PKG::IhuwUtilitySystems

Visibility: public

Operations

1. GetUtilitySystemsInventory

Visibility: public

Return Type Expression: HRESULT

4.4 User Interface Package (Presentation Layer)

FullPath: HU_PKG::HU_USERINTERFACE_PKG

Visibility: public

Classifier: ChupAnalysisDataDisplay

FullPath: HU_USERINTERFACE_PKG::ChupAnalysisDataDisplay

Visibility: public

Attributes

1. m_pDlgBrowser

Visibility: private

Multiplicity: 1

Type Expression: ChupDialogBrowser

2. m_pDlgBrowserEx

Visibility: private

Multiplicity: 1

Type Expression: ChupDialogBrowserEx

3. m_pTabBrowser

Visibility: private

Multiplicity: 1

Type Expression: ChupTabBrowser

4. m_pTabBrowserEx

Visibility: private

Multiplicity: 1

Type Expression: ChupTabBrowserPageEx

5. m_pTabBrowserPage

Visibility: private

Multiplicity: 1

Type Expression: ChupTabBrowserPage

Operations

1. DisplayTerrainData

Visibility: protected

Return Type Expression: LRESULT

2. DisplayDebrisParameters

Visibility: protected

Return Type Expression: LRESULT

3. DisplayShelterParameters

Visibility: protected

Return Type Expression: LRESULT

4. DisplayBldgEconomicParameters

Visibility: protected

Return Type Expression: LRESULT

Classifier: ChupChartDisplayDialog

FullPath: HU_USERINTERFACE_PKG::ChupChartDisplayDialog

Visibility: public

Attributes

1. m_hChartCtrlWnd

Visibility: private

Multiplicity: 1

Type Expression: HWND

2. m_hChartLibrary

Visibility: private

Multiplicity: 1

Type Expression: HINSTANCE

3. m_piDoc

Visibility: private

Multiplicity: 1

Type Expression: IMxDocumentPtr

Operations

1. OnInitDialog

Visibility: public

Return Type Expression: LRESULT

2. OnOK

Visibility: public

Return Type Expression: LRESULT

3. OnCancel

Visibility: public

Return Type Expression: LRESULT

4. OnPrint

Visibility: public

Return Type Expression: LRESULT

5. OnViewGraph

Visibility: public

Return Type Expression: LRESULT

Classifier: ChupDamageFunctionDisplay

FullPath: HU_USERINTERFACE_PKG::ChupDamageFunctionDisplay

Visibility: public

Attributes

1. m_pDlg

Visibility: private

Multiplicity: *

Type Expression: IhupChartDisplayDialog

Operations

1. DisplayDamageFunctions

Visibility: public

Return Type Expression: HRESULT

2. GetDamageFunctions

Visibility: public

Return Type Expression: HRESULT

3. SetBldgParams

Visibility: public

Return Type Expression: HRESULT

4. GetBldgParams

Visibility: public

Return Type Expression: HRESULT

Classifier: ChupDialogBrowser

FullPath: HU_USERINTERFACE_PKG::ChupDialogBrowser

Visibility: public

Attributes

1. m_hSpreadDLLInstance

Visibility: private

Multiplicity: 1

Type Expression: HINSTANCE

2. m_hSpreadWnd

Visibility: private

Multiplicity: 1

Type Expression: HWND

3. m_piDoc

Visibility: private

Multiplicity: 1

Type Expression: IMxDocumentPtr

Operations

1. OnInitDialog

Visibility: public

Return Type Expression: LRESULT

2. OnOK

Visibility: public

Return Type Expression: LRESULT

3. OnCancel

Visibility: public

Return Type Expression: LRESULT

4. OnApply

Visibility: public

Return Type Expression: LRESULT

5. OnMap

Visibility: public

Return Type Expression: LRESULT

6. OnPrint

Visibility: public

Return Type Expression: LRESULT

7. OnRButtonDown

Visibility: public

Return Type Expression: LRESULT

8. OnSize

Visibility: public

Return Type Expression: LRESULT

9. SetProps

Visibility: public

Return Type Expression: HRESULT

10. SetNumRows

Visibility: public

Return Type Expression: HRESULT

11. SetNumCols

Visibility: public

Return Type Expression: HRESULT

12. SetBorderType

Visibility: public

Return Type Expression: HRESULT

13. SetHeaderText

Visibility: public

Return Type Expression: HRESULT

14. SetColData

Visibility: public

Return Type Expression: HRESULT

15. SetColWidth

Visibility: public

Return Type Expression: HRESULT

16. SetRowHeight

Visibility: public

Return Type Expression: HRESULT

17. SetVirtual

Visibility: public

Return Type Expression: HRESULT

Classifier: ChupDialogBrowserEx

FullPath: HU_USERINTERFACE_PKG::ChupDialogBrowserEx

Visibility: public

Attributes

1. m_nControls

Visibility: private

Multiplicity: 1

Type Expression: unsigned long

2. m_pControls

Visibility: private

Multiplicity: *

Type Expression: CWindow

Operations

1. AddControl

Visibility: public

Return Type Expression: HRESULT

2. RemoveControl

Visibility: public

Return Type Expression: HRESULT

Classifier: ChupInventoryDataDisplay

FullPath: HU_USERINTERFACE_PKG::ChupInventoryDataDisplay

Visibility: public

Attributes

1. m_pDlgBrowser

Visibility: private

Multiplicity: 1

Type Expression: ChupDialogBrowser

2. m_pDlgBrowserEx

Visibility: private

Multiplicity: 1

Type Expression: ChupDialogBrowserEx

3. m_pTabBrowser

Visibility: private

Multiplicity: 1

Type Expression: ChupTabBrowser

4. m_pTabBrowserEx

Visibility: private

Multiplicity: 1

Type Expression: ChupTabBrowserPageEx

5. m_pTabBrowserPage

Visibility: private

Multiplicity: 1

Type Expression: ChupTabBrowserPage

Operations

1. DisplayGBSBuildingCount

Visibility: protected

Return Type Expression: LRESULT

2. DisplayGBSDollarExposure

Visibility: protected

Return Type Expression: LRESULT

3. DisplayGBSOccMappingScheme

Visibility: protected

Return Type Expression: LRESULT

4. DisplayGBSHurricaneMappingScheme

Visibility: protected

Return Type Expression: LRESULT

5. DisplayGBSValuationDlgWizard

Visibility: protected

Return Type Expression: LRESULT

6. DisplayEFInventory

Visibility: protected

Return Type Expression: LRESULT

7. DisplayEFOccMappingScheme

Visibility: protected

Return Type Expression: LRESULT

8. DisplayUserDefinedFacilities

Visibility: protected

Return Type Expression: LRESULT

9. DisplayHplfInventory

Visibility: protected

Return Type Expression: LRESULT

10. DisplayUtilitySystemsInventory

Visibility: protected

Return Type Expression: LRESULT

11. DisplayDemographics

Visibility: protected

Return Type Expression: LRESULT

12. DisplayHazMatInventory

Visibility: protected

Return Type Expression: LRESULT

13. DisplayInventoryClassification

Visibility: protected

Return Type Expression: LRESULT

Classifier: ChupLossFunctionDisplay

FullPath: HU_USERINTERFACE_PKG::ChupLossFunctionDisplay

Visibility: public

Attributes

1. m_pDlg

Visibility: private

Multiplicity: *

Type Expression: IhupChartDisplayDialog

Operations

1. DisplayLossFunctions

Visibility: public

Return Type Expression: LRESULT

2. GetLossFunctions

Visibility: public

Return Type Expression: LRESULT

3. SetBldgParams

Visibility: public

Return Type Expression: LRESULT

4. GetBldgParams

Visibility: public

Return Type Expression: LRESULT

Classifier: ChupPropertyPage

FullPath: HU_USERINTERFACE_PKG::ChupPropertyPage

Visibility: public

Classifier: ChupPropertySheet

FullPath: HU_USERINTERFACE_PKG::ChupPropertySheet

Visibility: public

Classifier: ChupResultsDataDisplay

FullPath: HU_USERINTERFACE_PKG::ChupResultsDataDisplay

Visibility: public

Attributes

1. m_pDlgBrowser

Visibility: private

Multiplicity: *

Type Expression: ChupDialogBrowser

2. m_pDlgBrowserEx

Visibility: private

Multiplicity: *

Type Expression: ChupDialogBrowserEx

3. m_pTabBrowser

Visibility: private

Multiplicity: *

Type Expression: ChupTabBrowser

4. m_pTabBrowserEx

Visibility: private

Multiplicity: *

Type Expression: ChupTabBrowserPageEx

5. m_pTabBrowserPage

Visibility: private

Multiplicity: *

Type Expression: ChupTabBrowserPage

Operations

1. DisplayGBSDmgStateResults

Visibility: protected

Return Type Expression: LRESULT

2. DisplayGBSEconomicLossResults

Visibility: protected

Return Type Expression: LRESULT

3. DisplayGBSHazardResults

Visibility: protected

Return Type Expression: LRESULT

4. DisplayDebrisResults

Visibility: protected

Return Type Expression: LRESULT

5. DisplayEssentialFaclitiesResults

Visibility: protected

Return Type Expression: LRESULT

6. DisplayUserDefinedFacilitiesResults

Visibility: protected

Return Type Expression: LRESULT

7. DisplayShelterRequirements

Visibility: protected

Return Type Expression: LRESULT

8. DisplaySummaryReports

Visibility: protected

Return Type Expression: LRESULT

Classifier: ChupScenarioDataDisplay

FullPath: HU_USERINTERFACE_PKG::ChupScenarioDataDisplay

Visibility: public

Operations

1. DisplayCurrentScenarioDlg

Visibility: public

Return Type Expression: LRESULT

Classifier: ChupScenarioWizard

FullPath: HU_USERINTERFACE_PKG::ChupScenarioWizard

Visibility: public

Classifier: ChupScenarioWizIntPg1

FullPath: HU_USERINTERFACE_PKG::ChupScenarioWizIntPg1

Visibility: public

Classifier: ChupScenarioWizIntPg2

FullPath: HU_USERINTERFACE_PKG::ChupScenarioWizIntPg2

Visibility: public

Classifier: ChupScenarioWizIntPg3

FullPath: HU_USERINTERFACE_PKG::ChupScenarioWizIntPg3

Visibility: public

Classifier: ChupScenarioWizIntPg4

FullPath: HU_USERINTERFACE_PKG::ChupScenarioWizIntPg4

Visibility: public

Classifier: ChupScenarioWizIntPg5

FullPath: HU_USERINTERFACE_PKG::ChupScenarioWizIntPg5

Visibility: public

Classifier: ChupScenarioWizIntPg6

FullPath: HU_USERINTERFACE_PKG::ChupScenarioWizIntPg6

Visibility: public

Classifier: ChupScenarioWizIntPg7

FullPath: HU_USERINTERFACE_PKG::ChupScenarioWizIntPg7

Visibility: public

Classifier: ChupScenarioWizIntPg8

FullPath: HU_USERINTERFACE_PKG::ChupScenarioWizIntPg8

Visibility: public

Classifier: ChupScenarioWizLastPg

FullPath: HU_USERINTERFACE_PKG::ChupScenarioWizLastPg

Visibility: public

Classifier: ChupScenarioWizMainPg

FullPath: HU_USERINTERFACE_PKG::ChupScenarioWizMainPg

Visibility: public

Classifier: ChupSummaryReportsPropSht

FullPath: HU_USERINTERFACE_PKG::ChupSummaryReportsPropSht

Visibility: public

Classifier: ChupSummaryRptPg1

FullPath: HU_USERINTERFACE_PKG::ChupSummaryRptPg1

Visibility: public

Classifier: ChupSummaryRptPg2

FullPath: HU_USERINTERFACE_PKG::ChupSummaryRptPg2

Visibility: public

Classifier: ChupSummaryRptPg3

FullPath: HU_USERINTERFACE_PKG::ChupSummaryRptPg3

Visibility: public

Classifier: ChupSummaryRptPg4

FullPath: HU_USERINTERFACE_PKG::ChupSummaryRptPg4

Visibility: public

Classifier: ChupSummaryRptPg5

FullPath: HU_USERINTERFACE_PKG::ChupSummaryRptPg5

Visibility: public

Classifier: ChupTabBrowser

FullPath: HU_USERINTERFACE_PKG::ChupTabBrowser

Visibility: public

Attributes

1. m_nPages

Visibility: private

Multiplicity: 1

Type Expression: unsigned long

2. m_pPages

Visibility: private

Multiplicity: *

Type Expression: ChupTabBrowserPage

Operations

1. OnInitDialog

Visibility: public

Return Type Expression: LRESULT

2. OnOK

Visibility: public

Return Type Expression: LRESULT

3. OnCancel

Visibility: public

Return Type Expression: LRESULT

4. OnApply

Visibility: public

Return Type Expression: LRESULT

5. OnSize

Visibility: public

Return Type Expression: LRESULT

6. OnMap

Visibility: public

Return Type Expression: LRESULT

7. AddPage

Visibility: public

Return Type Expression: HRESULT

8. RemovePage

Visibility: public

Return Type Expression: HRESULT

9. InsertPage

Visibility: public

Return Type Expression: HRESULT

10. GetCount

Visibility: public

Return Type Expression: HRESULT

11. GetPage

Visibility: public

Return Type Expression: HRESULT

Classifier: ChupTabBrowserPage

FullPath: HU_USERINTERFACE_PKG::ChupTabBrowserPage

Visibility: public

Attributes

1. m_hSpreadDLLInstance

Visibility: private

Multiplicity: 1

Type Expression: HINSTANCE

2. m_hSpreadWnd

Visibility: private

Multiplicity: 1

Type Expression: HWND

3. m_piDoc

Visibility: private

Multiplicity: 1

Type Expression: IMxDocumentPtr

Operations

1. OnInitDialog

Visibility: public

Return Type Expression: LRESULT

2. OnSize

Visibility: public

Return Type Expression: LRESULT

3. SetProps

Visibility: public

Return Type Expression: HRESULT

4. SetNumRows

Visibility: public

Return Type Expression: HRESULT

5. SetNumCols

Visibility: public

Return Type Expression: HRESULT

6. SetBorderType

Visibility: public

Return Type Expression: HRESULT

7. SetHeaderText

Visibility: public

Return Type Expression: HRESULT

8. SetColData

Visibility: public

Return Type Expression: HRESULT

9. SetColWidth

Visibility: public

Return Type Expression: HRESULT

10. SetRowHeight

Visibility: public

Return Type Expression: HRESULT

11. SetVirtual

Visibility: public

Return Type Expression: HRESULT

Classifier: ChupTabBrowserPageEx

FullPath: HU_USERINTERFACE_PKG::ChupTabBrowserPageEx

Visibility: public

Attributes

1. m_nControls

Visibility: private

Multiplicity: 1

Type Expression: unsigned long

2. m_pControls

Visibility: private

Multiplicity: *

Type Expression: CWindow

Operations

1. AddControl

Visibility: public

Return Type Expression: HRESULT

2. RemoveControl

Visibility: public

Return Type Expression: HRESULT

Classifier: ChupWiz97PropertyPage

FullPath: HU_USERINTERFACE_PKG::ChupWiz97PropertyPage

Visibility: public

Classifier: ChupWiz97PropertySheet

FullPath: HU_USERINTERFACE_PKG::ChupWiz97PropertySheet

Visibility: public

Interface: IhupAnalysisParamsDisplay

FullPath: HU_USERINTERFACE_PKG::IhupAnalysisParamsDisplay

Visibility: public

Interface: IhupChartDisplayDialog

FullPath: HU_USERINTERFACE_PKG::IhupChartDisplayDialog

Visibility: public

Interface: IhupDamageFunctionDisplay

FullPath: HU_USERINTERFACE_PKG::IhupDamageFunctionDisplay

Visibility: public

Interface: IhupDialogBrowser

FullPath: HU_USERINTERFACE_PKG::IhupDialogBrowser

Visibility: public

Interface: IhupDialogBrowserEx

FullPath: HU_USERINTERFACE_PKG::IhupDialogBrowserEx

Visibility: public

Interface: IhupInventoryDataDisplay

FullPath: HU_USERINTERFACE_PKG::IhupInventoryDataDisplay

Visibility: public

Interface: IhupLossFunctionDisplay

FullPath: HU_USERINTERFACE_PKG::IhupLossFunctionDisplay

Visibility: public

Interface: IhupPropertyPage

FullPath: HU_USERINTERFACE_PKG::IhupPropertyPage

Visibility: public

Interface: IhupPropertySheet

FullPath: HU_USERINTERFACE_PKG::IhupPropertySheet

Visibility: public

Interface: IhupResultsDataDisplay

FullPath: HU_USERINTERFACE_PKG::IhupResultsDataDisplay

Visibility: public

Interface: IhupScenarioDataDisplay

FullPath: HU_USERINTERFACE_PKG::IhupScenarioDataDisplay

Visibility: public

Interface: IhupScenarioWizard

FullPath: HU_USERINTERFACE_PKG::IhupScenarioWizard

Visibility: public

Interface: IhupTabBrowser

FullPath: HU_USERINTERFACE_PKG::IhupTabBrowser

Visibility: public

Interface: IhupTabBrowserEx

FullPath: HU_USERINTERFACE_PKG::IhupTabBrowserEx

Visibility: public

Interface: IhupTabBrowserPage

FullPath: HU_USERINTERFACE_PKG::IhupTabBrowserPage

Visibility: public

Interface: IhupWiz97PropertyPage

FullPath: HU_USERINTERFACE_PKG::IhupWiz97PropertyPage

Visibility: public

Interface: IhupWiz97PropertySheet

FullPath: HU_USERINTERFACE_PKG::IhupWiz97PropertySheet

Visibility: public

4.5 Report Engine Package (Presentation Layer)

FullPath: HU_PKG::HU_REPORTENGINE_PKG

Visibility: public

Classifier: ChuaReportViewer

FullPath: HU_REPORTENGINE_PKG::ChuaReportViewer

Visibility: public

Attributes

1. m_hRDCLibrary

Visibility: private

Multiplicity: 1

Type Expression: HINSTANCE

2. m_hCrystalReportViewer

Visibility: private

Multiplicity: 1

Type Expression: HWND

3. m_pReport

Visibility: private

Multiplicity: 1

Type Expression: IReportPtr

4. m_pCRApplication

Visibility: private

Multiplicity: 1

Type Expression: IApplicationPtr

Operations

1. OpenSummaryRpt

Visibility: public

Return Type Expression: HRESULT

2. OnInitDialog

Visibility: public

Return Type Expression: LRESULT

3. OnOK

Visibility: public

Return Type Expression: LRESULT

4. OnCancel

Visibility: public

Return Type Expression: LRESULT

5. OnSize

Visibility: public

Return Type Expression: LRESULT

6. OnRefresh

Visibility: public

Return Type Expression: LRESULT

7. OnPrint

Visibility: public

Return Type Expression: LRESULT

8. OnExport

Visibility: public

Return Type Expression: Boolean

9. LoadCRLibrary

Visibility: private

Return Type Expression: HINSTANCE

10. ReleaseCRLibrary

Visibility: private

Return Type Expression: HRESULT

11. CloseReport

Visibility: private

Return Type Expression: HRESULT

Classifier: huaSummaryReports

FullPath: HU_REPORTENGINE_PKG::huaSummaryReports

Visibility: public

Attributes

1. m_pRptViewer

Visibility: private

Multiplicity: *

Type Expression: ChuaReportViewer

Operations

1. CreateReportView

Visibility: public

Return Type Expression: HRESULT

2. ExportAs

Visibility: public

Return Type Expression: HRESULT

3. SaveAs

Visibility: public

Return Type Expression: HRESULT

4. SizeViewer

Visibility: public

Return Type Expression: HRESULT

5. PrintToFile

Visibility: public

Return Type Expression: HRESULT

6. Print

Visibility: public

Return Type Expression: HRESULT

Interface: IhuaSummaryReport

FullPath: HU_REPORTENGINE_PKG::IhuaSummaryReport

Visibility: public

4.6 Hurricane Support Package

Contains Package(s):
HAZUS-MH - Hurricane Model::HU Software Static UML Model::HU_PKG::HU_WORKFLOW_PKG
HAZUS-MH - Hurricane Model::HU Software Static UML Model::HU_PKG::HU_CALCULATIONENGINE _PKG
HAZUS-MH - Hurricane Model::HU Software Static UML Model::HU_PKG::HU_REPORTENGINE_PKG
HAZUS-MH - Hurricane Model::HU Software Static UML Model::HU_PKG::HU_USERINTERFACE_PKG

FullPath: HAZUS-MH - Hurricane Model::HU Software Static UML Model::HU_PKG

Visibility: public

Classifier: ChuArray

FullPath: HAZUS-MH - Hurricane Model::HU Software Static UML Model::HU_PKG::ChuArray

Visibility: public

Attributes

1. m_nElements

Visibility: private

Multiplicity: 1

Type Expression: unsigned long

Operations

1. Add

Visibility: public

Return Type Expression: HRESULT

2. Count

Visibility: public

Return Type Expression: HRESULT

3. Element

Visibility: public

Return Type Expression: HRESULT

4. Insert

Visibility: public

Return Type Expression: HRESULT

5. Remove

Visibility: public

Return Type Expression: HRESULT

6. RemoveAll

Visibility: public

Return Type Expression: HRESULT

Interface: IhuArray

FullPath: HAZUS-MH - Hurricane Model::HU Software Static UML Model::HU_PKG::IhuArray

Visibility: public

Operations

1. Add

Visibility: public

Return Type Expression: HRESULT

2. Count

Visibility: public

Return Type Expression: HRESULT

3. Element

Visibility: public

Return Type Expression: HRESULT

4. Insert

Visibility: public

Return Type Expression: HRESULT

5. Remove

Visibility: public

Return Type Expression: HRESULT

6. RemoveAll

Visibility: public

Return Type Expression: HRESULT

Appendix A: Acronyms

Acronym/ Abbreviation	Definition
ARA	Applied Research Associates, Inc.
CDM	Conceptual Design Model
COM	Component Object Model
DBA	Database Access
DDS	Detailed Design Specification
EF	Essential Facilities
ERD	Entity-Relationship Diagram
GBS	General Building Stock
GBT	General Building Type
GIS	Geographic Information System
GUI	Graphical User Interface
HAZUS	Hazards U. S.
HPLF	High Potential Loss Facilities
HM	Hurricane Model
IEEE	Institute of Electrical and Electronics Engineers
PDM	Physical Design Model
PRD	Product Requirements Document
SBT	Specific Building Type
SDD	Software Design Description
SRS	Software Requirements Specification
STD	Software Test Document
UDF	User Defined Facilities
WBT	Wind Building Type

Appendix B: Data Dictionary

B.1 System Database Table List

Table Name	Primary Key	Description
clBldgTypeHu	idtSbtName	List of Specific Building Type with a description of each (hu hazard)
huDamLossFun	AK_DL	Damage, Loss, Loss of Use, and Debris Functions
huDamLossFunDescription	idtDamLossDescID	Damage, Loss, Loss of Use, and Debris Classification
huDetermWindSpeedResults		Deterministic Wind Speed Results (hu spec.)
huDetermWindSpeedResultsByTimeStep	ak_senario_tract_time	Deterministic Wind Speed Results (hu spec.)
huErrorDef	idtErrID	List of Error codes and strings used in the HU Database and the HU user interface.
huGridProperties		Grid control grid properties
huGridPropertiesControl	PK_HU_GRIDCOL_TYPE	Grid Control control types
huGridPropertiesDataTypes	PK_HU_GRIDCOL_TYPE	Grid Control cell data type
huGridPropertiesEditMode	PK_HU_GRIDCOL_TYPE	Grid Control column edit modes
huGridPropertiesTextColor	PK_HU_GRIDCOL_TYPE	Grid Control cell text color
huGridPropertiesWidth	PK_HU_GRIDCOL_TYPE	Grid Contorl column width
huHistoricStormList	PK_Name	Historic storm list
huHistoricWindSpeedResults	AK_scnnametract	Historic storm wind speeds by historic storm
huListOfWindBldgTypes	itdwbID	combination of Specific Building type and there characteristics(hu hazard)
huOuputOptions	PK_huOuputOptions	Analysis option output scheme
huOutputOptionsByMap	PK_huOutputOptionsByMap	Analysis option map list
huOutputOptionsByMapFilterStr	PK_huOutputOptionsByMapFilterStr	Analysis option tree control name filter
huOutputOptionsByReport	PK_huOutputOptionsByReport	Analysis option report list
huOutputOptionsMapCol	PK_huOutputOptionsMapCol	Analysis option map enabled column names
huOutputOptionsMapFilters	PK_huOutputOptionsMapFilters	Analysis option tree control filter
huOutputOptionsMapRltsByFilter	PK_huOutputOptionsMapRltsByFilter	Analysis option map results filter
huOutputOptionsMapRltsType	PK_huOutputOptionsMapRltsType	Analysis option map results type
huOutputOptionsMapSchemes		Analysis option map schemes
huReports	PK_huReports	Analysis option report list
huScenario	idthuScenario	User-defined scenario list
huStormTrack		User defined and historic storm scenario containing storm track information. (hu hazard)
huTableParams		Metadata documents
huTerrain	idtTerrain	Surface Roughness Table

huTractInlandDistance		Inland distance of Tracts in 36 directions
huTreeBlowdownDensity	idtTreeDensity	Tree Blowdown tree density
huTreeBlowdownFunctions	AK_TreeBDown	Tree Blowdown functions
huTreeBlowdownHeight	idtTreeHeight	Tree Blowdown tree heights
huTreeBlowdownLossFunctions	AK_TreeBDownLoss	Tree Blowdown loss functions
huTreeBlowdownTreeType	PK_TreeType	Tree Blowdown tree types

B.2 System Database Table Columns List

Table Name	Column Name	Data Type	Description
clBldgTypeHu	SbtID	smallint	Specific buiding type ID
clBldgTypeHu	gbtDescription	char(100)	Specific buiding type description
clBldgTypeHu	gbtName	varchar(10)	General buiding type
clBldgTypeHu	sbtDescription	char(100)	General buiding type description
clBldgTypeHu	sbtName	varchar(10)	Hurricane Specific Building Type ID
huDamLossFun	DamLossDescID	smallint	Damage or Loss Description
huDamLossFun	TerrainID	smallint	Surface Roughness ID
huDamLossFun	WS100	real	Damage or Loss Function at 100 mph Wind Speed
huDamLossFun	WS105	real	Damage or Loss Function at 105 mph Wind Speed
huDamLossFun	WS110	real	Damage or Loss Function at 110 mph Wind Speed
huDamLossFun	WS115	real	Damage or Loss Function at 115 mph Wind Speed
huDamLossFun	WS120	real	Damage or Loss Function at 120 mph Wind Speed
huDamLossFun	WS125	real	Damage or Loss Function at 125 mph Wind Speed
huDamLossFun	WS130	real	Damage or Loss Function at 130 mph Wind Speed
huDamLossFun	WS135	real	Damage or Loss Function at 135 mph Wind Speed
huDamLossFun	WS140	real	Damage or Loss Function at 140 mph Wind Speed
huDamLossFun	WS145	real	Damage or Loss Function at 145 mph Wind Speed
huDamLossFun	WS150	real	Damage or Loss Function at 150 mph Wind Speed
huDamLossFun	WS155	real	Damage or Loss Function at 155 mph Wind Speed
huDamLossFun	WS160	real	Damage or Loss Function at 160 mph Wind Speed
huDamLossFun	WS165	real	Damage or Loss Function at 165 mph Wind Speed
huDamLossFun	WS170	real	Damage or Loss Function at 170 mph Wind Speed
huDamLossFun	WS175	real	Damage or Loss Function at 175 mph Wind Speed
huDamLossFun	WS180	real	Damage or Loss Function at 180 mph Wind Speed
huDamLossFun	WS185	real	Damage or Loss Function at 185 mph Wind Speed
huDamLossFun	WS190	real	Damage or Loss Function at 190 mph Wind Speed

Table Name	Column Name	Data Type	Description
huDamLossFun	WS195	real	Damage or Loss Function at 195 mph Wind Speed
huDamLossFun	WS200	real	Damage or Loss Function at 200 mph Wind Speed
huDamLossFun	WS205	real	Damage or Loss Function at 205 mph Wind Speed
huDamLossFun	WS210	real	Damage or Loss Function at 210 mph Wind Speed
huDamLossFun	WS215	real	Damage or Loss Function at 215 mph Wind
huDamLossFun	WS220	real	Damage or Loss Function at 220 mph Wind Speed
huDamLossFun	WS225	real	Damage or Loss Function at 225 mph Wind Speed
huDamLossFun	WS230	real	Damage or Loss Function at 230 mph Wind Speed
huDamLossFun	WS235	real	Damage or Loss Function at 235 mph Wind Speed
huDamLossFun	WS240	real	Damage or Loss Function at 240 mph Wind Speed
huDamLossFun	WS245	real	Damage or Loss Function at 245 mph Wind Speed
huDamLossFun	WS250	real	Damage or Loss Function at 250 mph Wind Speed
huDamLossFun	WS50	real	Damage or Loss Function at 50 mph Wind Speed
huDamLossFun	WS55	real	Damage or Loss Function at 55 mph Wind Speed
huDamLossFun	WS60	real	Damage or Loss Function at 60 mph Wind Speed
huDamLossFun	WS65	real	Damage or Loss Function at 65 mph Wind Speed
huDamLossFun	WS70	real	Damage or Loss Function at 70 mph Wind Speed
huDamLossFun	WS75	real	Damage or Loss Function at 75 mph Wind Speed
huDamLossFun	WS80	real	Damage or Loss Function at 80 mph Wind Speed
huDamLossFun	WS85	real	Damage or Loss Function at 85 mph Wind Speed
huDamLossFun	WS90	real	Damage or Loss Function at 90 mph Wind Speed
huDamLossFun	WS95	real	Damage or Loss Function at 95 mph Wind Speed
huDamLossFun	wbID	smallint	Wind Building Type ID
huDamLossFunDescription	DamLossClass	char(20)	Damage or Loss Function Classification
huDamLossFunDescription	DamLossDescID	smallint	Damage or Loss Description ID
huDamLossFunDescription	DamLossDescription	char(40)	Damage or Loss Description

Table Name	Column Name	Data Type	Description
huDetermWindSpeedResults	CenLat	decimal(11,6)	Tract centroid latitiude
huDetermWindSpeedResults	CenLongit	decimal(11,6)	Tract centroid longitude
huDetermWindSpeedResults	DistToCoast	real	Tract centroid distance to coastline
huDetermWindSpeedResults	MaxSustained	smallint	Deterministic Storm 1-min Sustained Wind Speed Results for each Census Tract (mph)
huDetermWindSpeedResults	PeakGust	smallint	Deterministic Storm Peak Gust Wind Speed for each Census Tract (mph)
huDetermWindSpeedResults	Tract	char(11)	Tract number (11-char)
huDetermWindSpeedResults	WindSpeedDir	smallint	Wind speed direction
huDetermWindSpeedResults	huScenarioName	varchar(40)	User defined scenario name
huDetermWindSpeedResultsByTimeStep	MinSustained	smallint	Deterministic Storm 1-min Sustained Wind Speed Results for each Census Tract (mph)
huDetermWindSpeedResultsByTimeStep	PeakGust	smallint	Deterministic Storm Peak Gust Wind Speed for each Census Tract (mph)
huDetermWindSpeedResultsByTimeStep	StepID	int	ID
huDetermWindSpeedResultsByTimeStep	TimeStep	real	Time step
huDetermWindSpeedResultsByTimeStep	Tract	char(11)	Tract number (11-char)
huDetermWindSpeedResultsByTimeStep	WindSpeedDir	smallint	Wind speed direction
huDetermWindSpeedResultsByTimeStep	WindSpeedDirDeg	real	Wind speed direction in degrees
huDetermWindSpeedResultsByTimeStep	huScenarioName	varchar(40)	User defined scenario name
huErrorDef	ErrID	smallint	Error Definition ID
huErrorDef	ErrMsg	varchar(256)	Error Definition Message
huGridProperties	GridName	varchar(50)	Grid Name
huGridProperties	HU_GRIDCOL_CONTROL	varchar(50)	Control Type
huGridProperties	HU_GRIDCOL_EDITMODE	varchar(50)	Edit Mode
huGridProperties	HU_GRIDCOL_EXTNAME	varchar(50)	Column display name
huGridProperties	HU_GRIDCOL_INDEX	int	Grid index
huGridProperties	HU_GRIDCOL_INTNAME	varchar(50)	Table column name
huGridProperties	HU_GRIDCOL_TOOLTIP	varchar(1024)	Coumn tool tip
huGridProperties	HU_GRIDCOL_TXTCOLOR	varchar(50)	Column color
huGridProperties	HU_GRIDCOL_TYPE	varchar(50)	Column data type
huGridProperties	HU_GRIDCOL_WIDTH	varchar(50)	Column width
huGridPropertiesControl	HU_GRIDCOL_CONTROL	varchar(50)	Control Type
huGridPropertiesControl	value	int	Control type value

Table Name	Column Name	Data Type	Description
huGridPropertiesDataTypes	HU_GRIDCOL_TYPE	varchar(50)	Column data type
huGridPropertiesDataTypes	value	int	Column data type value
huGridPropertiesEditMode	HU_GRIDCOL_EDITMODE	varchar(50)	Column edit mode
huGridPropertiesEditMode	value	int	Column edit mode value
huGridPropertiesTextColor	HU_GRIDCOL_TEXTCOLOR	varchar(50)	Column text color
huGridPropertiesTextColor	value	int	Column text color value
huGridPropertiesWidth	HU_GRIDCOL_WIDTH	varchar(50)	Column width
huGridPropertiesWidth	value	real	Column width value
huHistoricStormList	CurrentScenario	bit	Currnet historic storm flag
huHistoricStormList	Event	smallint	Event
huHistoricStormList	LandFallStates	varchar(50)	Land fall states
huHistoricStormList	NumStatesAffected	smallint	Number of states affected
huHistoricStormList	PeakGust	smallint	Peak gust wind speed
huHistoricStormList	StatesAffected	varchar(50)	States affected list
huHistoricStormList	StormNumber	smallint	Storm number
huHistoricStormList	Year	smallint	Storm year
huHistoricStormList	bSSCurrent	smallint	Current storm flag
huHistoricStormList	huScenarioName	varchar(40)	Historic storm name
huHistoricWindSpeedResults	MinSustained	smallint	Minimum sustained wind speed
huHistoricWindSpeedResults	PeakGust	smallint	Peak gust wind speed
huHistoricWindSpeedResults	Tract	char(11)	Census tract
huHistoricWindSpeedResults	huScenarioName	varchar(40)	Historic storm name
huListOfWindBldgTypes	CaseID	int	Wind building case id
huListOfWindBldgTypes	charDescription	varchar(100)	Wind building description
huListOfWindBldgTypes	nWindChar	smallint	Wind building number of character sets (5 char per set)
huListOfWindBldgTypes	sbtName	varchar(10)	Hurricane Specific Building Type ID
huListOfWindBldgTypes	wbID	smallint	Wind Building Type ID
huOuputOptions	OptionSchemeID	smallint	Option scheme ID
huOuputOptions	OptionSchemeName	varchar(100)	Option scheme name
huOuputOptions	RptExportType	smallint	Report export type
huOutputOptionsByMap	ColID	smallint	Map enabled column id
huOutputOptionsByMap	OptionSchemeID	smallint	Option scheme ID
huOutputOptionsByMap	RltsID	smallint	Results id
huOutputOptionsByMap	StrID	smallint	String id
huOutputOptionsByMap	bAvailable	bit	Map available flag
huOutputOptionsByMap	bMapSelected	bit	Map selected flag
huOutputOptionsByMapFilterStr	Return_Period	varchar(25)	Return period
huOutputOptionsByMapFilterStr	StrID	smallint	String id

Table Name	Column Name	Data Type	Description
huOutputOptionsByMapFilterStr	strFilters	varchar(50)	Filter string
huOutputOptionsByReport	OptionSchemeID	smallint	Option scheme ID
huOutputOptionsByReport	ReportID	smallint	Report id
huOutputOptionsByReport	bReportSelected	bit	Report selected flag
huOutputOptionsMapCol	ALT_Return_Period	varchar(25)	Return period display name
huOutputOptionsMapCol	ColID	smallint	Column id
huOutputOptionsMapCol	GridName	varchar(50)	Grid name
huOutputOptionsMapCol	HU_GRIDCOL_INTNAME	varchar(50)	Internal column name
huOutputOptionsMapCol	LegendColName	varchar(50)	Map legend display name
huOutputOptionsMapCol	LegendUnits	varchar(10)	Map legend units
huOutputOptionsMapFilters	AltTable	varchar(50)	Alternate table name
huOutputOptionsMapFilters	ColName	varchar(50)	Map column name
huOutputOptionsMapFilters	ColValue	varchar(50)	Map column value
huOutputOptionsMapFilters	DisplayOrder	smallint	User interface display order
huOutputOptionsMapFilters	FilterID	smallint	Map Filter id
huOutputOptionsMapFilters	FilterStr	char(5)	Map Filter string
huOutputOptionsMapFilters	FilterType	varchar(50)	Map fitler type
huOutputOptionsMapFilters	FilterValue	varchar(50)	Map filter value
huOutputOptionsMapFilters	ehuInventoryClass	varchar(25)	Inventory class
huOutputOptionsMapRltsByFilter	FilterID	smallint	Filter id
huOutputOptionsMapRltsByFilter	RltsID	smallint	Results id
huOutputOptionsMapRltsType	ColName	varchar(50)	Results column name
huOutputOptionsMapRltsType	ColValue	varchar(50)	Results column value
huOutputOptionsMapRltsType	DisplayOrder	smallint	Display order
huOutputOptionsMapRltsType	GenRlts	varchar(100)	General results
huOutputOptionsMapRltsType	GeoRes	tinyint	Tract or block resolution
huOutputOptionsMapRltsType	Legend	varchar(50)	Legend name
huOutputOptionsMapRltsType	MapOrder	smallint	Map order
huOutputOptionsMapRltsType	RltsID	smallint	Results id
huOutputOptionsMapRltsType	SecondaryTableName	varchar(100)	Secondary table name
huOutputOptionsMapRltsType	SpecRlts	varchar(100)	Specific results
huOutputOptionsMapRltsType	TableName	varchar(100)	Table name
huOutputOptionsMapRltsType	ehu_MAPDISPLAY_SCHEME	varchar(50)	Map display scheme
huOutputOptionsMapSchemes	eVal	int	Value
huOutputOptionsMapSchemes	ehu_MAPDISPLAY_SCHEME	varchar(50)	Map display scheme
huReports	DialogReportName	varchar(50)	Dialog report name
huReports	DialogTabName	varchar(50)	Dialog tab name
huReports	DisplayOrder	smallint	Display order
huReports	ExportFileName	varchar(50)	Export file name

Table Name	Column Name	Data Type	Description
huReports	FileName	varchar(50)	File name
huReports	ReportID	smallint	ID
huReports	ReportName	varchar(50)	Report Name
huReports	ReportType	varchar(50)	Report type
huReports	ScenarioType	varchar(25)	Scenario type
huReports	TemplateLoc	varchar(10)	RPT Template location
huScenario	Info	nvarchar(1000)	Description
huScenario	Type	tinyint	User defined scenario type
huScenario	bCentralPressure	bit	Central pressure flag
huScenario	bMaxWindSpeed	bit	Max wind speed flag
huScenario	bProfileParameter	bit	Profile parameter flag
huScenario	bRadiusType	bit	Radius to max winds flag
huScenario	bSSCurrent	bit	Current Hurricane Scenario Flag
huScenario	bTimeStep	bit	Time step flag
huScenario	bTranslationSpeed	bit	Translation speed flag
huScenario	huScenarioName	varchar(40)	HU Scenario Name
huStormTrack	CentralPressure	real	Deterministic Storm Track Central Pressure (mbar)
huStormTrack	Latitude	real	Deterministic Storm Track Latitude
huStormTrack	Longitude	real	Deterministic Storm Track Longitude
huStormTrack	MaxWindSpeed	real	Deterministic Storm Track Maximum Wind Speed (mph @ 10m)
huStormTrack	NewCentralPressure	real	Calculated central pressure
huStormTrack	NewTranslationSpeed	real	Calculated translation speed
huStormTrack	PointIndex	int	Deterministic Storm Track Point Index
huStormTrack	ProfileParameter	real	Deterministic Storm Track Profile Parameter
huStormTrack	RadiusToHurrWinds	real	Hurricane wind speed
huStormTrack	RadiusToMaxWinds	real	Deterministic Storm Track Radius to Max Winds (km)
huStormTrack	TimeStep	real	Deterministic Storm Track Time Step Between Storm Tracks (hours)
huStormTrack	TranslationSpeed	real	Deterministic Storm Track Translation Speed Between Storm Tracks (m/s)
huStormTrack	WindSpeedFactor	real	Wind speed factor
huStormTrack	huScenarioName	varchar(40)	Scenario Name
huStormTrack	huStormTrackPtID	smallint	Deterministic Hurricane Storm Scenario ID
huTableParams	HzMetaDataDoc	varchar(50)	HZ document name
huTableParams	huMetaDataDoc	varchar(50)	HU document Name
huTableParams	huTableName	varchar(100)	HU Table Name
huTableParams	hzTableName	varchar(100)	HZ Table Name
huTerrain	SRDescription	varchar(25)	Surface Roughness Description

Table Name	Column Name	Data Type	Description
huTerrain	SurfaceRoughness	real	Surface Roughness Value (meters)
huTerrain	TerrainID	smallint	Surface Roughness ID
huTractInlandDistance	Cnt	smallint	Direction count
huTractInlandDistance	Lat	decimal(11,6)	Centroid Latitude
huTractInlandDistance	Long	decimal(11,6)	Centroid longitude
huTractInlandDistance	MinDistance	smallint	Centroid minimum distance
huTractInlandDistance	Tract	char(11)	Census tract
huTractInlandDistance	d1	real	Direction 1 of 36
huTractInlandDistance	d10	real	Direction 11 of 36
huTractInlandDistance	d11	real	Direction 12 of 36
huTractInlandDistance	d12	real	Direction 1 of 36
huTractInlandDistance	d13	real	Direction 13 of 36
huTractInlandDistance	d14	real	Direction 14 of 36
huTractInlandDistance	d15	real	Direction 15 of 36
huTractInlandDistance	d16	real	Direction 16 of 36
huTractInlandDistance	d17	real	Direction 17 of 36
huTractInlandDistance	d18	real	Direction 18 of 36
huTractInlandDistance	d19	real	Direction 19 of 36
huTractInlandDistance	d2	real	Direction 2 of 36
huTractInlandDistance	d20	real	Direction 20 of 36
huTractInlandDistance	d21	real	Direction 21 of 36
huTractInlandDistance	d22	real	Direction 22 of 36
huTractInlandDistance	d23	real	Direction 23 of 36
huTractInlandDistance	d24	real	Direction 24 of 36
huTractInlandDistance	d25	real	Direction 25 of 36
huTractInlandDistance	d26	real	Direction 26 of 36
huTractInlandDistance	d27	real	Direction 27 of 36
huTractInlandDistance	d28	real	Direction 28 of 36
huTractInlandDistance	d29	real	Direction 29 of 36
huTractInlandDistance	d3	real	Direction 3 of 36
huTractInlandDistance	d30	real	Direction 30 of 36
huTractInlandDistance	d31	real	Direction 31 of 36
huTractInlandDistance	d32	real	Direction 32 of 36
huTractInlandDistance	d33	real	Direction 33 of 36
huTractInlandDistance	d34	real	Direction 34 of 36
huTractInlandDistance	d35	real	Direction 35 of 36
huTractInlandDistance	d36	real	Direction 36 of 36
huTractInlandDistance	d4	real	Direction 4 of 36
huTractInlandDistance	d5	real	Direction 5 of 36
huTractInlandDistance	d6	real	Direction 6 of 36

Table Name	Column Name	Data Type	Description
huTractInlandDistance	d7	real	Direction 7 of 36
huTractInlandDistance	d8	real	Direction 8 of 36
huTractInlandDistance	d9	real	Direction 9 of 36
huTreeBlowdownDensity	Description	varchar(100)	Tree density description
huTreeBlowdownDensity	TreeDensity	varchar(10)	Tree density
huTreeBlowdownFunctions	TreeDensity	varchar(10)	Tree function type
huTreeBlowdownFunctions	TreeHeight	varchar(10)	Tree height
huTreeBlowdownFunctions	TreeType	varchar(20)	Tree type
huTreeBlowdownFunctions	WS100	real	Damage or Loss Function at 100 mph Wind Speed
huTreeBlowdownFunctions	WS105	real	Damage or Loss Function at 105 mph Wind Speed
huTreeBlowdownFunctions	WS110	real	Damage or Loss Function at 110 mph Wind Speed
huTreeBlowdownFunctions	WS115	real	Damage or Loss Function at 115 mph Wind Speed
huTreeBlowdownFunctions	WS120	real	Damage or Loss Function at 120 mph Wind Speed
huTreeBlowdownFunctions	WS125	real	Damage or Loss Function at 125 mph Wind Speed
huTreeBlowdownFunctions	WS130	real	Damage or Loss Function at 130 mph Wind Speed
huTreeBlowdownFunctions	WS135	real	Damage or Loss Function at 135 mph Wind Speed
huTreeBlowdownFunctions	WS140	real	Damage or Loss Function at 140 mph Wind Speed
huTreeBlowdownFunctions	WS145	real	Damage or Loss Function at 145 mph Wind Speed
huTreeBlowdownFunctions	WS150	real	Damage or Loss Function at 150 mph Wind Speed
huTreeBlowdownFunctions	WS155	real	Damage or Loss Function at 155 mph Wind Speed
huTreeBlowdownFunctions	WS160	real	Damage or Loss Function at 160 mph Wind Speed
huTreeBlowdownFunctions	WS165	real	Damage or Loss Function at 165 mph Wind Speed
huTreeBlowdownFunctions	WS170	real	Damage or Loss Function at 170 mph Wind Speed
huTreeBlowdownFunctions	WS175	real	Damage or Loss Function at 175 mph Wind Speed
huTreeBlowdownFunctions	WS180	real	Damage or Loss Function at 180 mph Wind Speed
huTreeBlowdownFunctions	WS185	real	Damage or Loss Function at 185 mph Wind Speed
huTreeBlowdownFunctions	WS190	real	Damage or Loss Function at 190 mph Wind Speed
huTreeBlowdownFunctions	WS195	real	Damage or Loss Function at 195 mph Wind Speed

Table Name	Column Name	Data Type	Description
huTreeBlowdownFunctions	WS200	real	Damage or Loss Function at 200 mph Wind Speed
huTreeBlowdownFunctions	WS205	real	Damage or Loss Function at 205 mph Wind Speed
huTreeBlowdownFunctions	WS210	real	Damage or Loss Function at 210 mph Wind Speed
huTreeBlowdownFunctions	WS215	real	Damage or Loss Function at 215 mph Wind Speed
huTreeBlowdownFunctions	WS220	real	Damage or Loss Function at 220 mph Wind Speed
huTreeBlowdownFunctions	WS225	real	Damage or Loss Function at 225 mph Wind Speed
huTreeBlowdownFunctions	WS230	real	Damage or Loss Function at 230 mph Wind Speed
huTreeBlowdownFunctions	WS235	real	Damage or Loss Function at 235 mph Wind Speed
huTreeBlowdownFunctions	WS240	real	Damage or Loss Function at 240 mph Wind Speed
huTreeBlowdownFunctions	WS245	real	Damage or Loss Function at 245 mph Wind Speed
huTreeBlowdownFunctions	WS250	real	Damage or Loss Function at 250 mph Wind Speed
huTreeBlowdownFunctions	WS50	real	Damage or Loss Function at 50 mph Wind Speed
huTreeBlowdownFunctions	WS55	real	Damage or Loss Function at 55 mph Wind Speed
huTreeBlowdownFunctions	WS60	real	Damage or Loss Function at 60 mph Wind Speed
huTreeBlowdownFunctions	WS65	real	Damage or Loss Function at 65 mph Wind Speed
huTreeBlowdownFunctions	WS70	real	Damage or Loss Function at 70 mph Wind Speed
huTreeBlowdownFunctions	WS75	real	Damage or Loss Function at 75 mph Wind Speed
huTreeBlowdownFunctions	WS80	real	Damage or Loss Function at 80 mph Wind Speed
huTreeBlowdownFunctions	WS85	real	Damage or Loss Function at 85 mph Wind Speed
huTreeBlowdownFunctions	WS90	real	Damage or Loss Function at 90 mph Wind Speed
huTreeBlowdownFunctions	WS95	real	Damage or Loss Function at 95 mph Wind Speed
huTreeBlowdownHeight	Description	varchar(100)	Damage or Loss Function Classification
huTreeBlowdownHeight	TreeHeight	varchar(10)	Damage or Loss Description
huTreeBlowdownLossFunctions	LossType	varchar(20)	Loss type
huTreeBlowdownLossFunctions	TreeDensity	varchar(10)	Damage or Loss Description
huTreeBlowdownLossFunctions	TreeHeight	varchar(10)	Wind Building Type ID
huTreeBlowdownLossFunctions	TreeType	varchar(20)	Surface Roughness ID

Table Name	Column Name	Data Type	Description
huTreeBlowdownLossFunctions	WS100	real	Damage or Loss Function at 100 mph Wind Speed
huTreeBlowdownLossFunctions	WS105	real	Damage or Loss Function at 105 mph Wind Speed
huTreeBlowdownLossFunctions	WS110	real	Damage or Loss Function at 110 mph Wind Speed
huTreeBlowdownLossFunctions	WS115	real	Damage or Loss Function at 115 mph Wind Speed
huTreeBlowdownLossFunctions	WS120	real	Damage or Loss Function at 120 mph Wind Speed
huTreeBlowdownLossFunctions	WS125	real	Damage or Loss Function at 125 mph Wind Speed
huTreeBlowdownLossFunctions	WS130	real	Damage or Loss Function at 130 mph Wind Speed
huTreeBlowdownLossFunctions	WS135	real	Damage or Loss Function at 135 mph Wind Speed
huTreeBlowdownLossFunctions	WS140	real	Damage or Loss Function at 140 mph Wind Speed
huTreeBlowdownLossFunctions	WS145	real	Damage or Loss Function at 145 mph Wind Speed
huTreeBlowdownLossFunctions	WS150	real	Damage or Loss Function at 150 mph Wind Speed
huTreeBlowdownLossFunctions	WS155	real	Damage or Loss Function at 155 mph Wind Speed
huTreeBlowdownLossFunctions	WS160	real	Damage or Loss Function at 160 mph Wind Speed
huTreeBlowdownLossFunctions	WS165	real	Damage or Loss Function at 165 mph Wind Speed
huTreeBlowdownLossFunctions	WS170	real	Damage or Loss Function at 170 mph Wind Speed
huTreeBlowdownLossFunctions	WS175	real	Damage or Loss Function at 175 mph Wind Speed
huTreeBlowdownLossFunctions	WS180	real	Damage or Loss Function at 180 mph Wind Speed
huTreeBlowdownLossFunctions	WS185	real	Damage or Loss Function at 185 mph Wind Speed
huTreeBlowdownLossFunctions	WS190	real	Damage or Loss Function at 190 mph Wind Speed
huTreeBlowdownLossFunctions	WS195	real	Damage or Loss Function at 195 mph Wind Speed
huTreeBlowdownLossFunctions	WS200	real	Damage or Loss Function at 200 mph Wind Speed
huTreeBlowdownLossFunctions	WS205	real	Damage or Loss Function at 205 mph Wind Speed
huTreeBlowdownLossFunctions	WS210	real	Damage or Loss Function at 210 mph Wind Speed
huTreeBlowdownLossFunctions	WS215	real	Damage or Loss Function at 215 mph Wind Speed
huTreeBlowdownLossFunctions	WS220	real	Damage or Loss Function at 220 mph Wind Speed

Table Name	Column Name	Data Type	Description
huTreeBlowdownLossFunctions	WS225	real	Damage or Loss Function at 225 mph Wind Speed
huTreeBlowdownLossFunctions	WS230	real	Damage or Loss Function at 230 mph Wind Speed
huTreeBlowdownLossFunctions	WS235	real	Damage or Loss Function at 235 mph Wind Speed
huTreeBlowdownLossFunctions	WS240	real	Damage or Loss Function at 240 mph Wind Speed
huTreeBlowdownLossFunctions	WS245	real	Damage or Loss Function at 245 mph Wind Speed
huTreeBlowdownLossFunctions	WS250	real	Damage or Loss Function at 250 mph Wind Speed
huTreeBlowdownLossFunctions	WS50	real	Damage or Loss Function at 50 mph Wind Speed
huTreeBlowdownLossFunctions	WS55	real	Damage or Loss Function at 55 mph Wind Speed
huTreeBlowdownLossFunctions	WS60	real	Damage or Loss Function at 60 mph Wind Speed
huTreeBlowdownLossFunctions	WS65	real	Damage or Loss Function at 65 mph Wind Speed
huTreeBlowdownLossFunctions	WS70	real	Damage or Loss Function at 70 mph Wind Speed
huTreeBlowdownLossFunctions	WS75	real	Damage or Loss Function at 75 mph Wind Speed
huTreeBlowdownLossFunctions	WS80	real	Damage or Loss Function at 80 mph Wind Speed
huTreeBlowdownLossFunctions	WS85	real	Damage or Loss Function at 85 mph Wind Speed
huTreeBlowdownLossFunctions	WS90	real	Damage or Loss Function at 90 mph Wind Speed
huTreeBlowdownLossFunctions	WS95	real	Damage or Loss Function at 95 mph Wind Speed
huTreeBlowdownLossFunctions	bGarage	bit	Garage exist flag
huTreeBlowdownLossFunctions	sbtName	varchar(10)	Hurricane specific building type
huTreeBlowdownTreeType	Description	varchar(100)	Damage or Loss Function Classification
huTreeBlowdownTreeType	TreeType	varchar(20)	Damage or Loss Description

B.3 Template Database Table List

Name	Primary Key	Description
clBldgTypeHu	idtsbtName	Hurricane List of Specific Building Stock and Description
clOccupancy	idtOccupancy	General and specific occupancy classifications
huAnalysisOpt	idtOptID	Sets the hurricane analysis options for the user.
huAnalysisRunParameters	<None>	Analysis run level by Census Tract or Census Block
huBldgCharCase	PK_CaseID	Contential US/ Hawaii wind building filter
huBldgCharTree	<None>	Wind buiding characteristics tree control filter
huBldgCharValidity	idtbcvID	Matches valid building characteristics to the hurricane specific building types
huBldgCharWt	AK_hubmaplist_wbid	Contains the total weighted average for each unique building type (4325 types for each bldg char scheme).
huBldgCountBldgTypeB	idtKey	Building count by building type by census block.
huBldgCountBldgTypeT	idtKey	Building count table by census tract by specific bldg type. Unique to each hazard since specific bldg type classification varies by hazard.
huBldgEconBIAnnGrossSales	PK_Occupancy	Annual Gross Sales ($ per sqf)
huBldgEconBIBusinessInv	PK_Occupancy	Business Inventory (% of gross annual sales)
huBldgEconILOwnerOcc	PKOccupancy	Building Economic owner occupancy
huBldgEconILRecaptureFactors	PKOccupancy	Building Economic recapture factors
huBldgEconILRentalCost	PKOccupancy	Building Economic rental costs
huBldgEconILWageCapIncome	PKOccupancy	Building Economic wage income caps
huBldgEconLossTypes	pkEconLossType	Building Economic loss types
huBldgEconRTBusInterruption	PKOccupancy	Building Economic business interruption
huBldgMapping	Key_2	Hurricane Specific Wind Building Characteristic Distribution
huBldgMappingList	idthuBldgSchemeName	Hurricane Building Character Scheme List used for naming the characteristic distributions for each building type.
huBldgMappingListExt	PK_HUBLDGMAPPINGLISTExt	Mapping scheme name list extention. Allows the mapping scheme name to be greater than 25 characters
huBldgMapping_Updates	<None>	MR1 wind building mapping scheme updates
huBldgMapping_UpdatesMR2	<None>	MR2 wind building mapping scheme updates
huBldgTypeResultsB	Key_2	Damage and loss results by building type by Block
huBldgTypeResultsT	Key_2	Damage and loss results by building type by Tract
huCareFlty	idtKey	Hurricane Care Facility
huCensusBlock	idtKey	Hurricane Census Block data
huDebrisAndShelterDamTypesByRP	idtDLType	Hurricane Damage and Loss Classification by Return Period for debris and shelter
huDebrisResultsB	Key_2	Hurricane Debris Results by Block
huDebrisResultsT	Key_2	Hurricane Debris Results by Tract
huEfOccMapping	PKEFClass	Essential facilities occupancy to specific occupancy

Name	Primary Key	Description
		mapping
huEmergencyCtr	idtKey	Hurricane Emergency Center Facility
huExposureBldgTypeB	idtKey	Hurricane Dollar Exposure by Building Type by Census Block
huExposureBldgTypeT	idtKey	Hurricane Dollar Exposure by Building Type by Census Tract
huExposureContentBldgTypeB	idtKey	Hurricane Dollar Content Exposure by Building Type by Census Block
huExposureContentBldgTypeT	idtKey	Hurricane Dollar Content Exposure by Building Type by Census Tract
huFireStation	idtKey	Hurricane Fire Station
huGbsOccMapping	idtKey	Hurricane General Building Stock Occupancy Mapping
huGbsOccMappingList	idthuOccMapSchemeName	Hurricane List of occupancy mapping schemes for the general building stock
huGbsOccMappingListExt	PK_HUGBSOCCMAPPINGLISTExt	Geneal occupancy mapping scheme list. Extends name from 25 to 255 characters
huGenAnalysisOpt	idtGenOptID	Sets the hurricane Gen analysis options for the user.
huHazardMapWindSpeed	idtHazardMapWSKey	Wind Speeds by Return Period for each Census Tract. Use to display default wind speed map layers
huHazardMapWindSpeedB	idtHazardMapWSKey	Wind Speeds by Return Period for each Census Block. Use to display default wind speed map layers
huInCast	<None>	InCast hurricane data
huListOfBldgChar	idtBldgCharID	Hurricane Building Characteristics
huListOfWindBldgTypes	idtwbID	Hurricane List of Hurricane Wind Building Types
huOccResultsB	Key_2	Hurricane damage and loss results by occupancy by Block
huOccResultsT	Key_2	Hurricane damage and loss results by occupancy by Tract
huPoliceStation	idtKey	Hurricane Police Station Facility
huRPWindSpeeds	idtKey	Wind Speeds by Return Period for each Census Tract
huRPWindSpeedsB	idtKey	Wind Speeds by Return Period for each Census Block
huRapidLossResults	<None>	Rapid loss results
huReports	<None>	Hurricane summary report list
huResultsBldgEconOutputAndEmpOccB	idtKey	Building economic loss results by occupancy by Block
huResultsBldgEconOutputAndEmpOccT	idtKey	Building economic loss results by occupancy by Tract
huResultsCareFlty	idtKey	Medical care facilities results
huResultsEmergCtr	idtKey	Emergency center facilities results
huResultsFireStation	idtKey	Fire station results
huResultsPoliceStation	idtKey	Police station results
huResultsSchool	idtKey	School results
huResultsUserDefined	idtKey	User defined facilities results
huReturn Periods	idtReturnPeriod	List of return periods

Name	Primary Key	Description
huSchool	idtKey	Hurricane School Facility
huShelterCategoryWeights	PKClass	Shelter Category Weights
huShelterDSProb	PKWeightFactor	Default values for Damage State Probabilities
huShelterRelModFactors	PKClass	Hurricane specific Shelter Relative Modification Factors
huShelterResultsB	Key_2	Hurricane Shelter Results by Block
huShelterResultsT	Key_2	Hurricane Shelter Results by Tract
huShelterUtilityFactors	pk_Class	Hurricane Shelter utility factors
huSqFootageBldgTypeB	idtKey	Square Footage by Specific Bldg Type (hu specific)
huSqFootageBldgTypeT	idtKey	Square Footage by Specific Bldg Type (hu specific)
huSummaryDamage	Key_2	Summary damage results by Tract
huSummaryDamageB	AK_huSumDamB	Summary damage results by Block
huSummaryLoss	Key_2	Summary Loss Results by Tract
huSummaryLossB	Key_2	Summary Loss Results by Block
huTemplateScenario	Key_1	Current scenario
huTerrain	idtKey	Hurricane Surface Roughness for each Census Tract in the Study Region
huTerrainB	idtKey	Hurricane Surface Roughness for each Census Block in the Study Region
huTract	idtKey	Hurricane census tract datal. The study region hurricane census tract data is written to the huTerrain table in the template.
huTreeParameters	PK_tract	Tree parameters by Tract
huTreeParametersB	PK_block	Tree parameters by Block
huUserDefinedFlty	idtKey	Hurricane User Defined Facilities

B.4 Template Database Table Columns List

Table	Name	Data Type	Description
clBldgTypeHu	sbtName	varchar(10)	Hurricane Specific Building Type Name
clBldgTypeHu	SbtID	smallint	Hurricane Specific Building Type ID
clBldgTypeHu	gbtName	varchar(10)	General building type
clBldgTypeHu	sbtDescription	char(100)	Hurricane Specific Building Type Description
clBldgTypeHu	gbtDescription	char(100)	General building type description
clOccupancy	SoccDescription	char(100)	Specific occupancy description
clOccupancy	GoccDescription	char(100)	General occupancy description
clOccupancy	GoccName	varchar(20)	General occupancy
clOccupancy	Occupancy	char(5)	Specific occupancy class
clOccupancy	SoccID	smallint	Specific occupancy id
huAnalysisOpt	OptValue	smallint	Hurricane Analysis Option value
huAnalysisOpt	huAnalysisOpt	varchar(10)	Hurricane Analysis Option
huAnalysisRunParameters	OptimizationType	int	Type
huAnalysisRunParameters	OptimizationDesc	char(50)	Description
huAnalysisRunParameters	bValue	bit	Analysis flag
huAnalysisRunParameters	ValidValues	char(50)	Flag description
huBldgCharCase	CaseName	varchar(25)	Location Name
huBldgCharCase	CaseDescription	varchar(255)	Location description
huBldgCharCase	CaseID	int	Location Filter
huBldgCharTree	CharType	varchar(40)	Character category
huBldgCharTree	sbtName	varchar(10)	Specific building type
huBldgCharTree	CaseID	int	Location Filter
huBldgCharTree	ExcludedBldgCharTypeList	varchar(100)	Excluded building characteristics from tree control
huBldgCharTree	BldgChar	char(5)	Building characteristic
huBldgCharValidity	CaseID	int	Location Filter
huBldgCharValidity	sbtName	varchar(10)	Hurricane Specific Building Type Name
huBldgCharValidity	BldgCharID	int	Hurricane List of Wind Building Characteristic ID
huBldgCharValidity	bcvID	smallint	Hurricane Building Characteristic Validity ID
huBldgCharWt	WtPercent	real	Hurricane Wind Building Type Characteristic Total Distribution Value
huBldgCharWt	wbID	smallint	wbID should be one to one relationship with the huWindBldgChar Table in the system database.
huBldgCharWt	huBldgSchemeName	varchar(20)	Wind building mapping scheme
huBldgCountBldgTypeB	MERBLi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	MERBMi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	MERBHi	int	Hurricane Specific Building Type Count or Exposure

Table	Name	Data Type	Description
huBldgCountBldgTypeB	MLRM1i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	MLRIi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	MLRM2i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	MMUH3i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	CECBMi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	CECBLi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	CECBHi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	SPMBSi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	MECBLi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	MECBHi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	MECBMi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	CERBHi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	CERBLi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	CERBMi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	SPMBMi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	SECBMi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	SECBHi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	SECBLi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	SERBHi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	SERBMi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	MH94HUDIIi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	MH94HUDIIIi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	MHPHUDi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	MH94HUDIi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	MH76HUDi	int	Hurricane Specific Building Type Count or Exposure

Table	Name	Data Type	Description
huBldgCountBldgTypeB	MMUH2i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	MSF1i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	WMUH3i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	WMUH2i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	MSF2i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	MMUH1i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	SERBLi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	CensusBlock	char(15)	Full census block number
huBldgCountBldgTypeB	SPMBLi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	WMUH1i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	WSF1i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeB	WSF2i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	WSF2i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	WMUH1i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	WSF1i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	MSF2i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	MSF1i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	WMUH2i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	WMUH3i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	Tract	char(11)	Census Tract
huBldgCountBldgTypeT	MECBMi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	MECBHi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	MECBLi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	MERBHi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	CERBHi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	CERBLi	int	Hurricane Specific Building Type Count or Exposure

Table	Name	Data Type	Description
huBldgCountBldgTypeT	CERBMi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	CECBLi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	MMUH3i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	MLRM1i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	MMUH2i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	MERBMi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	MERBLi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	MLRM2i	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	MLRIi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	MH94HUDIIIi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	SECBHi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	MHPHUDi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	SECBMi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	SECBLi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	MH94HUDIIi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	MH76HUDi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	MH94HUDIi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	CECBMi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	SPMBSi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	SPMBMi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	CECBHi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	SERBHi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	SERBMi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	SPMBLi	int	Hurricane Specific Building Type Count or Exposure
huBldgCountBldgTypeT	SERBLi	int	Hurricane Specific Building Type Count or Exposure

Table	Name	Data Type	Description
huBldgCountBldgTypeT	MMUH1i	int	Hurricane Specific Building Type Count or Exposure
huBldgEconBIAnnGrossSales	Value	real	Gross annual sales factor
huBldgEconBIAnnGrossSales	Occupancy	char(5)	Specific occupancy class
huBldgEconBIBusinessInv	Occupancy	char(5)	Specific occupancy class
huBldgEconBIBusinessInv	Value	real	Business inventory factor
huBldgEconILOwnerOcc	OwnerOcc	real	Owner occupancy factor
huBldgEconILOwnerOcc	Occupancy	char(5)	Specific Occupancy
huBldgEconILRecaptureFactors	Income	real	Income factor
huBldgEconILRecaptureFactors	Employment	real	Employment factor
huBldgEconILRecaptureFactors	Occupancy	char(5)	Specific Occupancy
huBldgEconILRecaptureFactors	Wage	real	Wage factor
huBldgEconILRecaptureFactors	OutputRecapture	real	Output recapture factor
huBldgEconILRentalCost	RentalCostMonth	real	Rental cost per month factor
huBldgEconILRentalCost	Occupancy	char(5)	Specific occupancy
huBldgEconILRentalCost	DisruptionCost	real	Disruption factor
huBldgEconILRentalCost	RentalCostDay	real	Rental cost per day factor
huBldgEconILWageCapIncome	OutputDay	real	Output in days
huBldgEconILWageCapIncome	Occupancy	char(5)	Specific occupancy class
huBldgEconILWageCapIncome	IncomeYear	real	Income per Year Factor
huBldgEconILWageCapIncome	IncomeDay	real	Income per Day Factor
huBldgEconILWageCapIncome	Employment	real	Employment Factor
huBldgEconILWageCapIncome	WageDay	real	Wage per Day Factor
huBldgEconLossTypes	Description	varchar(25)	Economic Loss Type Description
huBldgEconLossTypes	EconLossType	varchar(12)	Economic Loss Type
huBldgEconRTBusInterruption	None	real	Building Economic No Damage State
huBldgEconRTBusInterruption	MinorDS	real	Building Economic Minor Damage State
huBldgEconRTBusInterruption	Occupancy	char(5)	Specific Occupancy Class
huBldgEconRTBusInterruption	ModerateDS	real	Building Economic Moderate Damage State
huBldgEconRTBusInterruption	CompleteDS	real	Building Economic Complete Damage State

Table	Name	Data Type	Description
huBldgEconRTBusInterruption	SevereDS	real	Building Economic Severe Damage State
huBldgMapping	sbtName	varchar(10)	Hurricane Specific Building Type Name
huBldgMapping	huBldgSchemeName	varchar(20)	Wind building mapping scheme
huBldgMapping	PercentDist	real	Hurricane Building Characteristic Distribution
huBldgMapping	BldgCharID	int	Hurricane List of Wind Building Characteristic ID
huBldgMappingList	SchemeDescription	varchar(40)	Hurricane Mapping Scheme List Description
huBldgMappingList	huBldgSchemeName	varchar(20)	Wind building mapping scheme
huBldgMappingList	SchemeUpdated	datetime	Hurricane Mapping Scheme List Updated Date
huBldgMappingList	Updateable	bit	Editable flag
huBldgMappingList	SchemeCreated	datetime	Hurricane Scheme Creation Date
huBldgMappingList	CaseID	int	Location Filter
huBldgMappingListExt	huBldgSchemeName	varchar(20)	Wind building mapping scheme
huBldgMappingListExt	huBldgSchemeNameExt	varchar(255)	Wind building mapping scheme displayed
huBldgMapping_Updates	BLDGCHARID	int	Wind building characteristic id
huBldgMapping_Updates	PercentDist	real	Wind building percent distribution
huBldgMapping_Updates	sbtName	varchar(10)	Specific building type
huBldgMapping_Updates	huBldgSchemeName	varchar(20)	Wind building mapping scheme name
huBldgMapping_UpdatesMR2	huBldgSchemeName	varchar(20)	Wind building mapping scheme name
huBldgMapping_UpdatesMR2	sbtName	varchar(10)	Specific building type
huBldgMapping_UpdatesMR2	BLDGCHARID	int	Building characteristic id
huBldgMapping_UpdatesMR2	PercentDist	real	Percent distribution
huBldgTypeResultsB	Severe	real	Hurricane Probability of Severe Damage
huBldgTypeResultsB	At Least Severe	real	Hurricane Probability of Least Severe Damage
huBldgTypeResultsB	At Least Moderate	real	Hurricane Probability of Least Moderate Damage
huBldgTypeResultsB	Moderate	real	Hurricane Probability of Moderate Damage
huBldgTypeResultsB	At Least Minor	real	Hurricane Probability of Least Minor
huBldgTypeResultsB	CensusBlock	char(15)	Full census block number
huBldgTypeResultsB	Complete	real	Hurricane Probability of Complete Damage
huBldgTypeResultsB	huScenarioName	varchar(40)	Hurricane scenario name
huBldgTypeResultsB	bCurrent	bit	Hurricane Results Current Flag
huBldgTypeResultsB	sbtName	varchar(10)	Hurricane Specific Building Type Name
huBldgTypeResultsB	Building	real	Building Loss
huBldgTypeResultsB	Content	real	Content loss
huBldgTypeResultsB	Inventory	real	Inventory loss
huBldgTypeResultsB	Total	real	Total loss
huBldgTypeResultsB	Return_Period	varchar(25)	Return period
huBldgTypeResultsB	Minor	real	Hurricane Probability of Minor Damage

Table	Name	Data Type	Description
huBldgTypeResultsB	Wage	real	Wage loss
huBldgTypeResultsB	Rental	real	Rental loss
huBldgTypeResultsB	No Damage	real	Hurricane Probability of No Damage
huBldgTypeResultsB	Relocation Cost	real	Relocation cost
huBldgTypeResultsB	Income	real	Income loss
huBldgTypeResultsT	Return_Period	varchar(25)	Return Period
huBldgTypeResultsT	Total	real	Total loss
huBldgTypeResultsT	Building	real	Building loss
huBldgTypeResultsT	sbtName	varchar(10)	Hurricane Specific Building Type Name
huBldgTypeResultsT	Tract	char(11)	Census Tract
huBldgTypeResultsT	Complete	real	Hurricane Probability of Complete Damage
huBldgTypeResultsT	Content	real	Content loss
huBldgTypeResultsT	Inventory	real	Inventory loss
huBldgTypeResultsT	Relocation Cost	real	Relocation loss
huBldgTypeResultsT	At Least Moderate	real	Hurricane Probability of At Least Moderate Damage
huBldgTypeResultsT	Severe	real	Hurricane Probability of Severe Damage
huBldgTypeResultsT	At Least Severe	real	Hurricane Probability of At Least Severe Damage
huBldgTypeResultsT	No Damage	real	Hurricane Probability of No Damage
huBldgTypeResultsT	Minor	real	Hurricane Probability of Minor Damage
huBldgTypeResultsT	Income	real	Income loss
huBldgTypeResultsT	Rental	real	Rental loss
huBldgTypeResultsT	Wage	real	Wage loss
huBldgTypeResultsT	Moderate	real	Hurricane Probability of Moderate Damage
huBldgTypeResultsT	At Least Minor	real	Hurricane Probability of At Least Minor Damage
huBldgTypeResultsT	bCurrent	bit	Hurricane Results Current Flag
huBldgTypeResultsT	huScenarioName	varchar(40)	Hurricane scenario name
huCareFlty	huBldgSchemeName	varchar(20)	Wind building mapping scheme name
huCareFlty	sbtName	varchar(10)	Hurricane Specific Building Type Name
huCareFlty	CareFltyId	char(8)	Emergency Care Facility
huCensusBlock	huBldgSchemeName	varchar(20)	Wind building mapping scheme name
huCensusBlock	SurfaceRoughness	real	Surface roughness by block
huCensusBlock	WindGridIndex	smallint	Wind grid index by block
huCensusBlock	huOccMapSchemeName	varchar(20)	Hurricane General Building Stock Occupancy Mapping List ID
huCensusBlock	CensusBlock	char(15)	Full census block number
huDebrisAndShelterDamTypesByRP	DLType	char(12)	Damage Type
huDebrisAndShelterDamTypesByRP	Type	char(5)	Damage type
huDebrisResultsB	huScenarioName	varchar(40)	Hurricane scenario name

Table	Name	Data Type	Description
huDebrisResultsB	bCurrent	bit	Hurricane Results Current Flag
huDebrisResultsB	CensusBlock	char(15)	Full census block number
huDebrisResultsB	Return_Period	varchar(25)	Return Period
huDebrisResultsB	BrickAndWood	int	Hurricane Debris Results for Brick and Wood
huDebrisResultsB	TreeVolume	real	Tree Debris by volumn
huDebrisResultsB	Tree	int	Tree Debris
huDebrisResultsB	ConcreteAndSteel	int	Hurricane Debris Results for Concrete and Steel
huDebrisResultsT	bCurrent	bit	Hurricane Results Current Flag
huDebrisResultsT	TreeVolume	real	Tree Debris Volumn
huDebrisResultsT	huScenarioName	varchar(40)	Hurricane scenario name
huDebrisResultsT	Return_Period	varchar(25)	Return Period
huDebrisResultsT	Tract	char(11)	Census Tract
huDebrisResultsT	BrickAndWood	int	Hurricane Debris Results for Brick and Wood
huDebrisResultsT	ConcreteAndSteel	int	Hurricane Debris Results for Concrete and Steel
huDebrisResultsT	Tree	int	Tree Debris
huEfOccMapping	Occupancy	char(10)	Occupancy type
huEfOccMapping	EFClass	char(5)	Essential facility occupancy
huEmergencyCtr	huBldgSchemeName	varchar(20)	Wind building mapping scheme name
huEmergencyCtr	sbtName	varchar(10)	Hurricane Specific Building Type Name
huEmergencyCtr	EocId	char(8)	Facility ID
huExposureBldgTypeB	SPMBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	SPMBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	CECBHi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	SPMBSi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	CECBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	MH94HUDIIi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	MH94HUDIIIi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	MH94HUDIi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	MH76HUDi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	SERBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	SERBHi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	SERBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	SECBHi	int	Hurricane Specific Building Type Count or

Table	Name	Data Type	Description
			Exposure
huExposureBldgTypeB	SECBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	SECBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	MHPHUDi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	MSF2i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	MSF1i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	WMUH3i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	MMUH1i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	MMUH2i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	MMUH3i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	WSF1i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	CensusBlock	char(15)	Full census block number
huExposureBldgTypeB	WMUH2i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	WSF2i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	WMUH1i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	CECBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	CERBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	MECBHi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	MECBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	CERBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	CERBHi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	MLRM1i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	MLRIi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	MLRM2i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	MECBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	MERBHi	int	Hurricane Specific Building Type Count or Exposure

Table	Name	Data Type	Description
huExposureBldgTypeB	MERBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeB	MERBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	MMUH3i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	CECBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	CECBHi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	SPMBSi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	CERBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	CECBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	CERBHi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	CERBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	SECBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	SERBHi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	SECBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	SPMBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	SPMBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	SERBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	SERBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	SECBHi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	WSF1i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	WSF2i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	Tract	char(11)	Census Tract
huExposureBldgTypeT	MLRM1i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	WMUH3i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	WMUH1i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	WMUH2i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	MECBHi	int	Hurricane Specific Building Type Count or

Table	Name	Data Type	Description
			Exposure
huExposureBldgTypeT	MECBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	MERBHi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	MECBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	MLRM2i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	MLRIi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	MERBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	MERBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	MSF1i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	MHPHUDi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	MH94HUDIIIi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	MH76HUDi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	MH94HUDIi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	MH94HUDIIi	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	MSF2i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	MMUH1i	int	Hurricane Specific Building Type Count or Exposure
huExposureBldgTypeT	MMUH2i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	MH94HUDIIIi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	MH94HUDIIi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	MH94HUDIi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	CERBHi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	CECBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	CECBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	CERBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	SPMBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTy	SPMBLi	int	Hurricane Specific Building Type Count or

Table	Name	Data Type	Description
peB			Exposure
huExposureContentBldgTypeB	SERBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	SPMBSi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	CECBHi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	MH76HUDi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	SECBHi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	MHPHUDi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	SERBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	SERBHi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	SECBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	SECBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	CERBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	MSF1i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	WMUH3i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	MSF2i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	MMUH1i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	MMUH2i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	WSF1i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	WMUH2i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	WSF2i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	WMUH1i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	CensusBlock	char(15)	Census Block
huExposureContentBldgTypeB	MECBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	MERBHi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	MECBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTy	MECBHi	int	Hurricane Specific Building Type Count or

Table	Name	Data Type	Description
peB			Exposure
huExposureContentBldgTypeB	MMUH3i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	MLRM2i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	MLRM1i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	MERBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	MLRIi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeB	MERBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	SECBHi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	MHPHUDi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	SECBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	Tract	char(11)	Census Tact
huExposureContentBldgTypeT	WSF1i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	MH94HUDIIIi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	MH76HUDi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	MH94HUDIIi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	MH94HUDIi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	SECBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	CERBHi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	CECBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	CECBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	MECBHi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	CERBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	CERBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	MECBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	SERBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTy	SERBLi	int	Hurricane Specific Building Type Count or

Table	Name	Data Type	Description
peT			Exposure
huExposureContentBldgTypeT	SERBHi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	CECBHi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	SPMBSi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	SPMBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	SPMBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	WSF2i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	MSF2i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	MSF1i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	MMUH1i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	MMUH2i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	WMUH1i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	WMUH3i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	WMUH2i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	MECBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	MERBMi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	MERBLi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	MERBHi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	MMUH3i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	MLRM2i	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	MLRIi	int	Hurricane Specific Building Type Count or Exposure
huExposureContentBldgTypeT	MLRM1i	int	Hurricane Specific Building Type Count or Exposure
huFireStation	sbtName	varchar(10)	Hurricane Specific Building Type Name
huFireStation	FireStationId	char(8)	Fire station ID
huFireStation	huBldgSchemeName	varchar(20)	Wind building mapping scheme
huGbsOccMapping	CECBLp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	CERBMp	tinyint	Hurricane Specific Building Types Percentage of

Table	Name	Data Type	Description
			Occupancy Class
huGbsOccMapping	CERBHp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	MECBLp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	MECBMp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	CERBLp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	MECBHp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	CECBMp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	MMUH3p	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	MLRM1p	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	MMUH2p	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	MMUH1p	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	MERBMp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	MLRM2p	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	MERBLp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	MLRIp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	huOccMapSchemeName	varchar(20)	Hurricane General Building Stock Occupancy Mapping List ID
huGbsOccMapping	WSF1p	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	WSF2p	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	Occupancy	char(5)	Specific occupancy class
huGbsOccMapping	MSF2p	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	MSF1p	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	WMUH1p	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	WMUH3p	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	WMUH2p	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	MERBHp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	MHPHUDp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class

Table	Name	Data Type	Description
huGbsOccMapping	MH76HUDp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	SECBHp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	SECBMp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	MH94HUDIIIp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	MH94HUDIp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	MH94HUDIIp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	CECBHp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	SPMBMp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	SPMBLp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	SPMBSp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	SECBLp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	SERBHp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	SERBLp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMapping	SERBMp	tinyint	Hurricane Specific Building Types Percentage of Occupancy Class
huGbsOccMappingList	SchemeUpdated	datetime	Hurricane Mapping Scheme List Updated Date
huGbsOccMappingList	Updateable	bit	Mapping scheme editable
huGbsOccMappingList	CaseID	int	Location Filter
huGbsOccMappingList	SchemeCreated	datetime	Hurricane Scheme Creation Date
huGbsOccMappingList	SchemeDescription	varchar(40)	Hurricane Mapping Scheme List Description
huGbsOccMappingList	huOccMapSchemeName	varchar(20)	Hurricane General Building Stock Occupancy Mapping List ID
huGbsOccMappingListExt	huOccMapSchemeName	varchar(20)	General occupancy mapping scheme name
huGbsOccMappingListExt	huOccMapSchemeNameExt	varchar(255)	General occupancy mapping scheme name long
huGenAnalysisOpt	Reserved	smallint	Hurricane Analysis Option
huGenAnalysisOpt	huGenAnalysisOpt	int	General Analysis Option
huHazardMapWindSpeed	Tract	char(11)	Cenus Tract
huHazardMapWindSpeed	f20yr	real	Probabilistic Storm Wind Speed for Return Period 2 (mph)
huHazardMapWindSpeed	f10yr	real	Probabilistic Storm Wind Speed for Return Period 1 (mph)
huHazardMapWindSpeed	f50yr	real	Probabilistic Storm Wind Speed for Return Period 3 (mph)
huHazardMapWindSpeed	f200yr	real	Probabilistic Storm Wind Speed for Return Period 5 (mph)

Table	Name	Data Type	Description
huHazardMapWindSpeed	f500yr	real	Probabilistic Storm Wind Speed for Return Period 6 (mph)
huHazardMapWindSpeed	f1000yr	real	Probabilistic Storm Wind Speed for Return Period 7 (mph)
huHazardMapWindSpeed	f100yr	real	Probabilistic Storm Wind Speed for Return Period 4 (mph)
huHazardMapWindSpeedB	CensusBlock	char(15)	Census Block
huHazardMapWindSpeedB	f10yr	real	Probabilistic Storm Wind Speed for Return Period 1 (mph)
huHazardMapWindSpeedB	f1000yr	real	Probabilistic Storm Wind Speed for Return Period 7 (mph)
huHazardMapWindSpeedB	f500yr	real	Probabilistic Storm Wind Speed for Return Period 6 (mph)
huHazardMapWindSpeedB	f200yr	real	Probabilistic Storm Wind Speed for Return Period 5 (mph)
huHazardMapWindSpeedB	f20yr	real	Probabilistic Storm Wind Speed for Return Period 2 (mph)
huHazardMapWindSpeedB	f100yr	real	Probabilistic Storm Wind Speed for Return Period 4 (mph)
huHazardMapWindSpeedB	f50yr	real	Probabilistic Storm Wind Speed for Return Period 3 (mph)
huInCast	ShieldingHeight	varchar(45)	Sheilding Height
huInCast	WindShielding	varchar(15)	Wind Shielding Height
huInCast	Topography	varchar(15)	Topography
huInCast	WindDebrisSource	varchar(30)	Wind Debris Source
huInCast	WindSpeedType	varchar(15)	Wind speed type
huInCast	RoofSlope	varchar(25)	Roof Slope
huInCast	WallExposure	int	Wall Exposure
huInCast	MHTieDowns	varchar(11)	Manufactured Home Tie Down
huInCast	WindExposure	varchar(25)	Wind Exposures
huInCast	WindDesignYear	smallint	Wind Speed Design Year
huInCast	hzIncastID	int	Incast ID
huInCast	WindSpeed	smallint	Wind Speed
huInCast	ShutterCde	varchar(30)	Shelter Code
huInCast	GarageDoors	varchar(15)	Garage Doors
huInCast	RollUpDoors	varchar(15)	Roll Up Doors
huInCast	RoofSheathing	varchar(30)	Roof Sheathing
huInCast	ShutterType	varchar(15)	Shutter Type
huInCast	WindDesignCode	varchar(15)	Wind Design Code
huInCast	DeckAttach	varchar(12)	Deck Attachement Type
huInCast	DoorProtection	varchar(15)	Door Protection
huInCast	OtherDoorArea	varchar(15)	Other Door Area
huInCast	MHWindZone	varchar(15)	MH Wind Zone
huInCast	MHCode	varchar(30)	MH Code

Table	Name	Data Type	Description
huInCast	Protection	varchar(25)	Protection Type
huInCast	RoofPerimeter	varchar(30)	Roof Perimeter
huInCast	RoofCovering	varchar(45)	Roof Cover
huInCast	NailSize	varchar(15)	Deck Nail Size
huInCast	NailSpacing	varchar(15)	Deck Nail Spacing
huInCast	GlassConstr	varchar(15)	Glass Construction Type
huInCast	Glass	varchar(30)	Glass Type
huInCast	Openings	varchar(15)	Opening type
huInCast	WallAnchorage	varchar(15)	Wall Anchors
huInCast	Cladding	varchar(45)	Wall Cladding
huInCast	RoofShape	varchar(15)	Roof Shape
huInCast	GableBracing	varchar(15)	Gable End Bracing
huInCast	FrameSpacing	varchar(15)	Wall Framing Spacing
huListOfBldgChar	bcDescription	varchar(100)	Hurricane List of Wind Building Characteristic Description
huListOfBldgChar	CharType	varchar(40)	Wind building characteristic type
huListOfBldgChar	BldgCharID	int	Hurricane List of Wind Building Characteristic ID
huListOfBldgChar	bcName	varchar(25)	Building characteristic name
huListOfBldgChar	BldgChar	char(5)	Hurricane List of Wind Building Characteristic Names
huListOfWindBldgTypes	wbID	smallint	Hurricane Wind Building Type ID (equalent to wbID in System Database)
huListOfWindBldgTypes	sbtName	varchar(10)	Hurricane Specific Building Type Name
huListOfWindBldgTypes	CaseID	int	Location Filter
huListOfWindBldgTypes	nWindChar	smallint	Hurricane Number of Wind Building Characteristics per Wind Building Type
huListOfWindBldgTypes	charDescription	char(100)	Hurricane List of Wind Building Types Description
huOccResultsB	At Least Minor	real	Hurricane Probability of At Least Minor Damage
huOccResultsB	Moderate	real	Hurricane Probability of Moderate Damage
huOccResultsB	Minor	real	Hurricane Probability of Minor Damage
huOccResultsB	No Damage	real	Hurricane Probability of No Damage
huOccResultsB	Wage	real	Wage Loss
huOccResultsB	huScenarioName	varchar(40)	Hurricane scenario name
huOccResultsB	bCurrent	bit	Hurricane Results Current Flag
huOccResultsB	At Least Moderate	real	Hurricane Probability of At Least Moderate Damage
huOccResultsB	At Least Severe	real	Hurricane Probability of At Least Severe Damage
huOccResultsB	Severe	real	Hurricane Probability of Severe Damage
huOccResultsB	Complete	real	Hurricane Probability of Complete Damage
huOccResultsB	Return_Period	varchar(25)	Return Period
huOccResultsB	Total	real	Total Loss
huOccResultsB	Occupancy	char(5)	Specific occupancy class

Table	Name	Data Type	Description
huOccResultsB	CensusBlock	char(15)	Full census block number
huOccResultsB	Rental	real	Rental loss
huOccResultsB	Relocation Cost	real	Relocation Cost
huOccResultsB	Income	real	Income Loss
huOccResultsB	Building	real	Building Loss
huOccResultsB	Inventory	real	Inventory Loss
huOccResultsB	Content	real	Content Loss
huOccResultsT	huScenarioName	varchar(40)	Hurricane scenario name
huOccResultsT	bCurrent	bit	Hurricane Results Current Flag
huOccResultsT	At Least Minor	real	Hurricane Probability of At Least Minor
huOccResultsT	Moderate	real	Hurricane Probability of Moderate Damage
huOccResultsT	Minor	real	Hurricane Probability of Minor Damage
huOccResultsT	No Damage	real	Hurricane Probability of No Damage
huOccResultsT	Wage	real	Wage Loss
huOccResultsT	Complete	real	Hurricane Probability of Complete Damage
huOccResultsT	At Least Moderate	real	Hurricane Probability of At Least Moderate Damage
huOccResultsT	At Least Severe	real	Hurricane Probability of At Least Severe Damage
huOccResultsT	Severe	real	Hurricane Probability of Severe Damage
huOccResultsT	Tract	char(11)	Census Tract
huOccResultsT	Total	real	Total Loss
huOccResultsT	Building	real	Building Loss
huOccResultsT	Return_Period	varchar(25)	Return Period
huOccResultsT	Occupancy	char(5)	Specific occupancy class
huOccResultsT	Rental	real	Rental Loss
huOccResultsT	Income	real	Income Loss
huOccResultsT	Content	real	Content Loss
huOccResultsT	Relocation Cost	real	Relocation Cost
huOccResultsT	Inventory	real	Inventory Loss
huPoliceStation	PoliceStationId	char(8)	Facility ID
huPoliceStation	sbtName	varchar(10)	Hurricane Specific Building Type Name
huPoliceStation	huBldgSchemeName	varchar(20)	Wind building mapping scheme name
huRPWindSpeeds	wRtnP2	smallint	Probabilistic Storm Wind Speed for Return Period 2 (mph)
huRPWindSpeeds	wRtnP3	smallint	Probabilistic Storm Wind Speed for Return Period 3 (mph)
huRPWindSpeeds	Tract	char(11)	Census Tract
huRPWindSpeeds	wRtnP1	smallint	Probabilistic Storm Wind Speed for Return Period 1 (mph)
huRPWindSpeeds	wRtnP7	smallint	Probabilistic Storm Wind Speed for Return Period 7 (mph)
huRPWindSpeeds	wRtnP4	smallint	Probabilistic Storm Wind Speed for Return Period

Table	Name	Data Type	Description
			4 (mph)
huRPWindSpeeds	wRtnP6	smallint	Probabilistic Storm Wind Speed for Return Period 6 (mph)
huRPWindSpeeds	wRtnP5	smallint	Probabilistic Storm Wind Speed for Return Period 5 (mph)
huRPWindSpeedsB	wRtnP7	smallint	Probabilistic Storm Wind Speed for Return Period 7 (mph)
huRPWindSpeedsB	wRtnP4	smallint	Probabilistic Storm Wind Speed for Return Period 4 (mph)
huRPWindSpeedsB	wRtnP3	smallint	Probabilistic Storm Wind Speed for Return Period 3 (mph)
huRPWindSpeedsB	wRtnP2	smallint	Probabilistic Storm Wind Speed for Return Period 2 (mph)
huRPWindSpeedsB	wRtnP5	smallint	Probabilistic Storm Wind Speed for Return Period 5 (mph)
huRPWindSpeedsB	wRtnP6	smallint	Probabilistic Storm Wind Speed for Return Period 6 (mph)
huRPWindSpeedsB	CensusBlock	char(15)	Census Block
huRPWindSpeedsB	wRtnP1	smallint	Probabilistic Storm Wind Speed for Return Period 1 (mph)
huRapidLossResults	LossType	varchar(50)	Loss Type (Building, content, etc)
huRapidLossResults	Percentile	smallint	Percentile
huRapidLossResults	ResultsType	varchar(50)	Results Type
huRapidLossResults	ResultsValue	real	Results Value
huRapidLossResults	huScenarioName	varchar(40)	Hurricane scenario name
huReports	FileName	varchar(50)	Long Report Name
huReports	bAvailable	smallint	Available Flag
huReports	ReportName	varchar(50)	Short Report Name
huReports	TabName	varchar(50)	Report Tab Name
huResultsBldgEconOutputAndEmpOccB	EconLossType	varchar(12)	Loss Type (Building, content, etc)
huResultsBldgEconOutputAndEmpOccB	RES2I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	RES1I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	IND6I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	IND2I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	IND5I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	IND3I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	IND4I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	IND1I	real	Building Economic Output results by occupancy

Table	Name	Data Type	Description
huResultsBldgEconOutputAndEmpOccB	EDU1I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	EDU2I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	GOV2I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	AGR1I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	REL1I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	Return_Period	varchar(25)	Return Period
huResultsBldgEconOutputAndEmpOccB	huScenarioName	varchar(40)	Hurricane scenario name
huResultsBldgEconOutputAndEmpOccB	CensusBlock	char(15)	Census Block
huResultsBldgEconOutputAndEmpOccB	GOV1I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	RES3FI	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	RES3EI	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	RES4I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	RES5I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	RES6I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	RES3CI	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	RES3DI	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	RES3BI	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	RES3AI	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	COM10I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	COM7I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	COM6I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	COM8I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	COM9I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	COM1I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	COM2I	real	Building Economic Output results by occupancy

Table	Name	Data Type	Description
huResultsBldgEconOutputAndEmpOccB	COM5I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	COM3I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccB	COM4I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	RES1I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	EconLossType	varchar(12)	Loss Type (Building, content, etc)
huResultsBldgEconOutputAndEmpOccT	Return_Period	varchar(25)	Return Period
huResultsBldgEconOutputAndEmpOccT	COM1I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	COM2I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	RES6I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	RES5I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	COM5I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	COM3I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	COM4I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	COM6I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	RES3BI	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	RES3CI	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	RES3AI	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	RES4I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	RES3FI	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	RES3DI	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	RES3EI	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	huScenarioName	varchar(40)	Hurricane scenario name
huResultsBldgEconOutputAndEmpOccT	REL1I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	GOV1I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	AGR1I	real	Building Economic Output results by occupancy

Table	Name	Data Type	Description
huResultsBldgEconOutputAndEmpOccT	IND6I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	EDU2I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	GOV2I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	EDU1I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	COM7I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	COM9I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	COM10I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	COM8I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	IND5I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	IND4I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	IND1I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	IND3I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	IND2I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	RES2I	real	Building Economic Output results by occupancy
huResultsBldgEconOutputAndEmpOccT	Tract	char(11)	Census Tract
huResultsCareFlty	Minor	real	Hurricane Probability of Minor Damage
huResultsCareFlty	Moderate	real	Hurricane Probability of Moderate Damage
huResultsCareFlty	LossOfUse	real	Loss of User in days
huResultsCareFlty	bCurrent	bit	Hurricane Results Current Flag
huResultsCareFlty	huScenarioName	varchar(40)	Hurricane scenario name
huResultsCareFlty	Severe	real	Hurricane Probability of Severe Damage
huResultsCareFlty	Complete	real	Hurricane Probability of Complete Damage
huResultsCareFlty	Return_Period	varchar(25)	Return Period
huResultsCareFlty	CareFltyId	char(8)	Facility ID
huResultsEmergCtr	Severe	real	Hurricane Probability of Severe Damage
huResultsEmergCtr	Complete	real	Hurricane Probability of Complete Damage
huResultsEmergCtr	huScenarioName	varchar(40)	Hurricane scenario name
huResultsEmergCtr	LossOfUse	real	Loss of User in days
huResultsEmergCtr	Moderate	real	Hurricane Probability of Moderate Damage
huResultsEmergCtr	Minor	real	Hurricane Probability of Minor Damage
huResultsEmergCtr	bCurrent	bit	Hurricane Results Current Flag

Table	Name	Data Type	Description
huResultsEmergCtr	Return_Period	varchar(25)	Return Period
huResultsEmergCtr	EocId	char(8)	Facility ID
huResultsFireStation	Complete	real	Hurricane Probability of Complete Damage
huResultsFireStation	Severe	real	Hurricane Probability of Severe Damage
huResultsFireStation	huScenarioName	varchar(40)	Hurricane scenario name
huResultsFireStation	Minor	real	Hurricane Probability of Minor Damage
huResultsFireStation	bCurrent	bit	Hurricane Results Current Flag
huResultsFireStation	LossOfUse	real	Loss of User in days
huResultsFireStation	Moderate	real	Hurricane Probability of Moderate Damage
huResultsFireStation	Return_Period	varchar(25)	Return Period
huResultsFireStation	FireStationId	char(8)	Facility ID
huResultsPoliceStation	LossOfUse	real	Loss of User in days
huResultsPoliceStation	Minor	real	Hurricane Probability of Minor Damage
huResultsPoliceStation	bCurrent	bit	Hurricane Results Current Flag
huResultsPoliceStation	huScenarioName	varchar(40)	Hurricane scenario name
huResultsPoliceStation	Return_Period	varchar(25)	Return Period
huResultsPoliceStation	PoliceStationId	char(8)	Facility ID
huResultsPoliceStation	Moderate	real	Hurricane Probability of Moderate Damage
huResultsPoliceStation	Complete	real	Hurricane Probability of Complete Damage
huResultsPoliceStation	Severe	real	Hurricane Probability of Severe Damage
huResultsSchool	Minor	real	Hurricane Probability of Minor Damage
huResultsSchool	Moderate	real	Hurricane Probability of Moderate Damage
huResultsSchool	LossOfUse	real	Loss of User in days
huResultsSchool	SchoolId	char(8)	Facility ID
huResultsSchool	Return_Period	varchar(25)	Return Period
huResultsSchool	Severe	real	Hurricane Probability of Severe Damage
huResultsSchool	huScenarioName	varchar(40)	Hurricane scenario name
huResultsSchool	Complete	real	Hurricane Probability of Complete Damage
huResultsSchool	bCurrent	bit	Hurricane Results Current Flag
huResultsUserDefined	Moderate	real	Hurricane Probability of Moderate Damage
huResultsUserDefined	Minor	real	Hurricane Probability of Minor Damage
huResultsUserDefined	bCurrent	bit	Hurricane Results Current Flag
huResultsUserDefined	Severe	real	Hurricane Probability of Severe Damage
huResultsUserDefined	Complete	real	Hurricane Probability of Complete Damage
huResultsUserDefined	huScenarioName	varchar(40)	Hurricane scenario name
huResultsUserDefined	Return_Period	varchar(25)	Return Period
huResultsUserDefined	UserDefinedFltyId	char(8)	Facility ID
huReturn Periods	RPString	varchar(25)	Return Period description
huReturn Periods	Return_Period	varchar(25)	Return Period
huSchool	sbtName	varchar(10)	Hurricane Specific Building Type Name

Table	Name	Data Type	Description
huSchool	SchoolId	char(8)	Facility ID
huSchool	huBldgSchemeName	varchar(20)	Wind Building Mapping Scheme
huShelterCategoryWeights	Value	real	Shelter Category Weight Value
huShelterCategoryWeights	Class	char(5)	Shelter Category Weight class
huShelterCategoryWeights	Description	varchar(100)	Shelter Category Weight Description
huShelterDSProb	Value	real	Shelter Damage State Probility Value
huShelterDSProb	WeightFactor	char(5)	Shelter Damage State Probility weight factor
huShelterDSProb	Description	varchar(100)	Shelter Damage State Probility Description
huShelterRelModFactors	Value	real	Shelter relocation modification factor value
huShelterRelModFactors	Class	char(5)	Shelter relocation modification factor classs
huShelterRelModFactors	Description	varchar(100)	Shelter relocation modification factor description
huShelterResultsB	huScenarioName	varchar(40)	Hurricane scenario name
huShelterResultsB	Return_Period	varchar(25)	Return Period
huShelterResultsB	DisplacedHouseHolds	int	Hurricane Shelter Displaced Housholds Results
huShelterResultsB	CensusBlock	char(15)	Full census block number
huShelterResultsB	bCurrent	bit	Hurricane Results Current Flag
huShelterResultsB	ShortTermShelterNeeds	int	Hurricane Shelter Short Term Needs Results
huShelterResultsT	Return_Period	varchar(25)	Return Period
huShelterResultsT	DisplacedHouseHolds	int	Hurricane Shelter Displaced Housholds Results
huShelterResultsT	Tract	char(11)	Census Tract
huShelterResultsT	huScenarioName	varchar(40)	Hurricane scenario name
huShelterResultsT	ShortTermShelterNeeds	int	Hurricane Shelter Short Term Needs Results
huShelterResultsT	bCurrent	bit	Hurricane Results Current Flag
huShelterUtilityFactors	Description	varchar(100)	Shelter utility description
huShelterUtilityFactors	Class	char(5)	Shelter utility class
huShelterUtilityFactors	Value	real	Shelter utility factor
huSqFootageBldgTypeB	CECBLi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	CERBHi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	CERBMi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	CECBMi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	CECBHi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	SPMBSi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	MERBHi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	MERBMi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	CERBLi	real	Hurricane Specific Building Type Count or

Table	Name	Data Type	Description
			Exposure
huSqFootageBldgTypeB	MECBHi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	MECBLi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	MECBMi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	MERBLi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	MH76HUDi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	MHPHUDi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	SECBHi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	MH94HUDIIIi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	MH94HUDIi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	MH94HUDIIi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	SPMBMi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	SERBLi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	SPMBLi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	SECBMi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	SECBLi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	SERBMi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	SERBHi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	CensusBlock	char(15)	Full census block number
huSqFootageBldgTypeB	MSF1i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	WMUH3i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	MSF2i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	MMUH1i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	WSF1i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	WMUH2i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	WSF2i	real	Hurricane Specific Building Type Count or Exposure

Table	Name	Data Type	Description
huSqFootageBldgTypeB	WMUH1i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	MLRIi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	MLRM2i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	MMUH2i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	MLRM1i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeB	MMUH3i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	CECBLi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	MERBMi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	CERBHi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	MERBLi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	MLRIi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	MERBHi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	MECBMi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	MECBLi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	CERBMi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	MECBHi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	CERBLi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	MLRM2i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	SECBMi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	SECBLi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	SERBHi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	MH76HUDi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	SECBHi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	MHPHUDi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	CECBMi	real	Hurricane Specific Building Type Count or Exposure

Table	Name	Data Type	Description
huSqFootageBldgTypeT	SPMBSi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	CECBHi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	SERBMi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	SERBLi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	SPMBMi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	SPMBLi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	MH94HUDIi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	WSF1i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	WSF2i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	WMUH1i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	MH94HUDIIIi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	Tract	char(11)	Census Tract
huSqFootageBldgTypeT	MH94HUDIIi	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	MLRM1i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	MMUH2i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	MMUH1i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	MMUH3i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	WMUH2i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	WMUH3i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	MSF2i	real	Hurricane Specific Building Type Count or Exposure
huSqFootageBldgTypeT	MSF1i	real	Hurricane Specific Building Type Count or Exposure
huSummaryDamage	ShelterDisp	real	Shelter displacement
huSummaryDamage	ComDamage	real	Complete damage
huSummaryDamage	SevDamage	real	Severe damage
huSummaryDamage	ShelterShortTerm	real	Short term shelter requirements
huSummaryDamage	huScenarioName	varchar(40)	Hurricane scenario name
huSummaryDamage	Tract	char(11)	Census Tract
huSummaryDamage	ReturnPeriod	varchar(25)	Return Period

Table	Name	Data Type	Description
huSummaryDamage	GenBldgOrGenOcc	varchar(20)	General Buiding or General Occupancy
huSummaryDamage	ModDamage	real	Moderate damage
huSummaryDamage	NonDamage	real	No damage
huSummaryDamage	MinDamage	real	Minor damage
huSummaryDamageB	ShelterShortTerm	real	Short term shelter requirements
huSummaryDamageB	ModDamage	real	Moderate Damage
huSummaryDamageB	MinDamage	real	Minimal Damage
huSummaryDamageB	NonDamage	real	No Damage
huSummaryDamageB	SevDamage	real	Severe Damage
huSummaryDamageB	ComDamage	real	Complete Damage
huSummaryDamageB	ShelterDisp	real	Shelter Displacement
huSummaryDamageB	huScenarioName	varchar(40)	Hurricane scenario name
huSummaryDamageB	ReturnPeriod	varchar(25)	Return Period
huSummaryDamageB	CensusBlock	char(15)	Census Block
huSummaryDamageB	GenBldgOrGenOcc	varchar(20)	General Buiding or General Occupancy
huSummaryLoss	RelLoss	real	Relocation Loss
huSummaryLoss	InvLoss	real	Inventory Loss
huSummaryLoss	ConLoss	real	Content Loss
huSummaryLoss	WagLoss	real	Wage Loss
huSummaryLoss	IncLoss	real	Income Loss
huSummaryLoss	RenLoss	real	Rental Loss
huSummaryLoss	huScenarioName	varchar(40)	Hurricane scenario name
huSummaryLoss	GenBldgOrGenOcc	varchar(20)	General Buiding or General Occupancy
huSummaryLoss	Tract	char(11)	Census Tract
huSummaryLoss	BuiLoss	real	Bulding Loss
huSummaryLoss	ReturnPeriod	varchar(25)	Return Period
huSummaryLoss	TotLoss	real	Total Loss
huSummaryLossB	TotLoss	real	Total Loss
huSummaryLossB	ReturnPeriod	varchar(25)	Return Period
huSummaryLossB	GenBldgOrGenOcc	varchar(20)	General Buiding or General Occupancy
huSummaryLossB	BuiLoss	real	Building Loss
huSummaryLossB	ConLoss	real	Content Loss
huSummaryLossB	InvLoss	real	Inventory Loss
huSummaryLossB	WagLoss	real	Wage Loss
huSummaryLossB	huScenarioName	varchar(40)	Hurricane scenario name
huSummaryLossB	RelLoss	real	Relocation Loss
huSummaryLossB	IncLoss	real	Income Loss
huSummaryLossB	CensusBlock	char(15)	Full census block number
huSummaryLossB	RenLoss	real	Rental Loss
huTemplateScenario	CurrentScenario	varchar(40)	Current hurricane scenario name

Table	Name	Data Type	Description
huTerrain	SRindex	float	Hurricane Surface Roughness Index (Calculated)
huTerrain	Tract	char(11)	Census Tract
huTerrain	SurfaceRoughness	real	Hurricane Surface Roughness Value (meters)
huTerrainB	SRindex	float	Hurricane Surface Roughness Index (Calculated)
huTerrainB	CensusBlock	char(15)	Census Block
huTerrainB	SurfaceRoughness	real	Hurricane Surface Roughness Value (meters)
huTract	WindGridIndex	smallint	Wind grid index
huTract	huOccMapSchemeName	varchar(20)	Hurricane General Building Stock Occupancy Mapping List ID
huTract	huBldgSchemeName	varchar(20)	Wind building mapping scheme name
huTract	Tract	char(11)	Census Block
huTract	DistToCoast	real	Distance between the Census Tract Centroid and the Coast Line
huTract	SurfaceRoughness	real	Hurricane Surface Roughness Value (meters)
huTreeParameters	StemsPerAcre	int	Count of stems per acre
huTreeParameters	PreDomTreeType	varchar(20)	Predominate tree type
huTreeParameters	Tract	char(11)	Census Tract
huTreeParameters	TreeHeightGreater60	real	Count greater than 60 ft
huTreeParameters	TreeHeightLess40	real	Count less than 40 ft
huTreeParameters	TreeHeight40To60	real	Count 40 to 60 ft
huTreeParametersB	TreeHeightGreater60	real	Count greater than 60 ft
huTreeParametersB	TreeHeightLess40	real	Count less than 40 ft
huTreeParametersB	TreeHeight40To60	real	Count 40 to 60 ft
huTreeParametersB	CensusBlock	char(15)	Census Block
huTreeParametersB	StemsPerAcre	int	Count of Stems per Acre
huTreeParametersB	PreDomTreeType	varchar(20)	Perdominate Tree Type
huUserDefinedFlty	UserDefinedFltyId	char(8)	Facility ID
huUserDefinedFlty	huBldgSchemeName	varchar(20)	Wind Building Mapping Scheme
huUserDefinedFlty	sbtName	varchar(10)	Hurricane Specific Building Type Name