CWMS Database Schema 3.0.4

# Location Kind Changes

**STREAM\_LOCATION**. This a new name for the previous STREAMGAGE location kind. Its numerical code remains the same, and the location kind table is still AT\_STREAM\_LOCATION. Management routines are still in the CWMS\_STREAM package.

**GATE**. This location kind existed previously, but was unusable. It remains a sub-kind of OUTLET. It doesn’t have a location kind table. An OUTLET location is considered to be a GATE kind when the outlet’s rating group is referenced by an entry in the AT\_GATE\_GROUP table. Management routines are in the CWMS\_GATE package.

**OVERFLOW**. This location kind existed previously, but was unusable. It remains a sub-kind of OUTLET. Its location kind table is AT\_OVERFLOW, and its management routines are in the CWMS\_OVERFLOW package.

**STREAM\_GAGE**. This is a new location kind that is a sub-kind of STREAM\_LOCATION. Its location kind table is AT\_GAGE, and its management routines are in the CWMS\_GAGE package.

**STREAM\_REACH**. This is a new location kind. Its location kind table is AT\_STREAM\_REACH, and its management routines are in the CWMS\_STREAM package.

**PUMP**. This is a new location kind that is a sub-kind of STREAM\_LOCATION. Its location kind table is AT\_PUMP and its management routines are in the CWMS\_PUMP package.

**WEATHER\_GAGE**. This is a new location kind. Its location kind table is AT\_GAGE, and its management routines are in the CWMS\_GAGE package.

**ENTITY**. This is a new location kind. Its location kind table is AT\_ENTITY\_LOCATION and its management routines are in the CWMS\_ENTITY package.

As previously, location kinds are not all mutually exclusive. The single location kind returned by the CWMS\_LOC.CHECK\_LOCATION\_KIND routine is the most descriptive kind for the location. Some locations can have entries is multiple location kind tables due to sub-kinds (i.e., an OVERFLOW location must have entries in AT\_OUTLET and AT\_OVERFLOW). In addition, locations that have entries in the AT\_PROJECT, AT\_EMBANKMENT, AT\_OUTLET, AT\_TURBINE, AT\_LOCK, or AT\_ENTITY table may or may not also have entries in AT\_STREAM\_LOCATION and/or AT\_GAGE tables.

# Stream Reach Changes

Stream reaches have been completely redesigned. Reaches are now first class locations that have the following characteristics:

* Each reach is defined by the combination its stream, upstream and downstream locations, and configuration. At least one of the upstream and downstream locations must be on the specified stream. The upstream location may be at the diverting station (but no farther upstream) of the diverting stream for the specified stream, while the downstream station may be at the confluence station (but no farther downstream) of the receiving stream for the specified stream.
* Stream reaches using the same configuration may not overlap.
* A stream network may have multiple stream reach configurations.

# CWMS RADAR Routines

This schema contains routines for use with the CWMS Restful API for Data Retrieval web service. Specifically, the routines are:

* CWMS\_CAT.RETRIEVE\_OFFICES
* CWMS\_CAT.RETRIEVE\_OFFICES\_F
* CWMS\_CAT.RETRIEVE\_PARAMETERS
* CWMS\_CAT.RETRIEVE\_PARAMETERS\_F
* CWMS\_CAT.RETRIEVE\_TIME\_ZONES
* CWMS\_CAT.RETRIEVE\_TIME\_ZONES\_F
* CWMS\_CAT.RETRIEVE\_UNITS
* CWMS\_CAT.RETRIEVE\_UNITS\_F
* CWMS\_LEVEL.RETRIEVE\_LOCATION\_LEVELS
* CWMS\_LEVEL.RETRIEVE\_LOCATION\_LEVELS\_F
* CWMS\_LOC.RETRIEVE\_LOCATIONS
* CWMS\_LOC.RETRIEVE\_LOCATIONS\_F
* CWMS\_RATING.RETRIEVE\_RATINGS
* CWMS\_RATING.RETRIEVE\_RATINGS\_F
* CWMS\_TS.RETRIEVE\_TIME\_SERIES
* CWMS\_TS.RETRIEVE\_TIME\_SERIES\_F

# Gate and Overflow Routines

The CWMS\_GATE and CWMS\_OVERFLOW package routines will manage outlet information, eliminating the need to use CWMS\_OUTLET package routines. The CWMS\_OUTLET routines need to be used only when managing generic outlet locations that are not gates or overflows.

# View Changes

## New Views

**AV\_CONFIGURATION**. Contains configurations. Columns are:

* OFFICE\_ID VARCHAR2(16)
* CONFIGURATION\_ID VARCHAR2(32)
* PARENT\_CONFIGURATION\_ID VARCHAR2(32)
* CATEGORY\_ID VARCHAR2(16)
* CONFIGURATION\_NAME VARCHAR2(128)
* CONFIGURATION\_CODE NUMBER(10)
* PARENT\_CODE NUMBER(10)

**AV\_CONFIGURATION\_CATEGORY**. Contains configuration categories. Columns are:

* CATEGORY\_ID VARCHAR2(16)
* DESCRIPTION VARCHAR2(48)

**AV\_ENTITY**. Contains entities. Columns are:

* OFFICE\_ID VARCHAR2(16)
* ENTITY\_ID VARCHAR2(32)
* PARENT\_ENTITY\_ID VARCHAR2(32)
* CATEGORY\_ID VARCHAR2(3)
* ENTITY\_NAME VARCHAR2(128)
* ENTITY\_CODE NUMBER(10)
* PARENT\_CODE NUMBER(10)

**AV\_ENTITY\_CATEGORY**. Contains entity categories. Columns are:

* CATEGORY\_ID VARCHAR2(16)
* DESCRIPTION VARCHAR2(48)

**AV\_ENTITY\_LOCATION**. Contains location-entity associations. Used as location kind table for ENTITY location kind. Columns are:

* LOCATION\_OFFICE\_ID VARCHAR2(16)
* BASE\_LOCATION\_ID VARCHAR2(256)
* SUB\_LOCATION\_ID VARCHAR2(32)
* LOCATION\_ID VARCHAR2(289)
* ENTITY\_OFFICE\_ID VARCHAR2(16)
* ENTITY\_ID VARCHAR2(32)
* PARENT\_ENTITY\_ID VARCHAR2(32)
* ENTITY\_CATEGORY\_ID VARCHAR2(3)
* ENTITY\_NAME VARCHAR2(128)
* ALIASED\_ITEM VARCHAR2(13)
* LOC\_ALIAS\_CATEGORY VARCHAR2(32)
* LOC\_ALIAS\_GROUP VARCHAR2(65)
* LOCATION\_OFFICE\_CODE NUMBER
* BASE\_LOCATION\_CODE NUMBER
* LOCATION\_CODE NUMBER(10)
* ENTITY\_OFFICE\_CODE NUMBER(10)
* ENTITY\_CODE NUMBER(10)
* PARENT\_ENTITY\_CODE NUMBER(10)

**AV\_OVERFLOW**. Contains information on uncontrolled spillways/weirs. Used as location kind table for OVERFLOW location kind. Columns are:

* OFFICE\_ID VARCHAR2(16)
* OVERFLOW\_LOCATION\_ID VARCHAR2(49)
* UNIT\_SYSTEM CHAR(2)
* CREST\_ELEVATION VARCHAR2(4000)
* ELEVATION\_UNIT VARCHAR2(2)
* LENGTH\_OR\_DIAMETER VARCHAR2(4000)
* LENGTH\_UNIT VARCHAR2(2)
* IS\_CIRCULAR VARCHAR2(1)
* RATING\_SPEC\_ID VARCHAR2(372)
* DESCRIPTION VARCHAR2(128)
* OVERFLOW\_LOCATION\_CODE NUMBER(10)
* RATING\_SPEC\_CODE NUMBER(10)

**AV\_PUMP**. Contains information on pump locations. Used as location kind table for PUMP location kind. Columns are:

* OFFICE\_ID VARCHAR2(16)
* PUMP\_LOCATION\_ID VARCHAR2(49)
* DESCRIPTION VARCHAR2(128)
* PUMP\_LOCATION\_CODE NUMBER(10)

**AV\_USGS\_PARAMETER\_ALL**. Contains parameter conversion information for converting among USGS, CWMS, and SHEF parameters. Columns are:

* USGS\_PARAMETER\_CODE NUMBER(38)
* USGS\_PARAMETER\_ID VARCHAR2(5)
* BASE\_PARAMETER\_ID VARCHAR2(16)
* SUB\_PARAMETER\_ID VARCHAR2(32)
* PARAMETER\_ID VARCHAR2(49)
* PARAMETER\_TYPE\_ID VARCHAR2(16)
* UNIT\_ID VARCHAR2(16)
* CWMS\_CONVERSION\_FACTOR BINARY\_DOUBLE
* CWMS\_CONVERSION\_OFFSET BINARY\_DOUBLE
* SHEF\_PHYSICAL\_ELEMENT VARCHAR2(2)
* SHEF\_UNIT\_IS\_ENGLISH VARCHAR2(1)
* SHEF\_CONVERSION\_FACTOR BINARY\_DOUBLE
* SHEF\_CONVERSION\_OFFSET BINARY\_DOUBLE
* USGS\_PARAMETER\_NAME VARCHAR2(170)
* CWMS\_PARAMETER\_NAME VARCHAR2(195)

**AV\_WATER\_USER\_CONTRACT**. Contains information on water user contracts, without location aliases. Columns are:

* OFFICE\_ID VARCHAR2(16)
* PROJECT\_ID VARCHAR2(49)
* ENTITY\_NAME VARCHAR2(64)
* WATER\_RIGHT VARCHAR2(255)
* CONTRACT\_NAME VARCHAR2(64)
* CONTRACT\_TYPE VARCHAR2(25)
* CONTRACT\_STORAGE\_UNIT VARCHAR2(16)
* CONTRACTED\_STORAGE BINARY\_DOUBLE
* CONTRACT\_EFFECTIVE\_DATE VARCHAR2(11)
* CONTRACT\_EXPIRATION\_DATE VARCHAR2(11)
* INITIAL\_USE\_ALLOCATION BINARY\_DOUBLE
* FUTURE\_USE\_ALLOCATION BINARY\_DOUBLE
* FUTURE\_USE\_PERCENT\_ACTIVATED BINARY\_DOUBLE
* TOTAL\_ALLOC\_PERCENT\_ACTIVATED BINARY\_DOUBLE
* CONTRACTED\_STORAGE\_M3 BINARY\_DOUBLE
* PUMP\_OUT\_LOCATION\_ID VARCHAR2(49)
* PUMP\_OUT\_BELOW\_LOCATION\_ID VARCHAR2(49)
* PUMP\_IN\_LOCATION\_ID VARCHAR2(49)
* PROJECT\_LOCATION\_CODE NUMBER(10)
* PUMP\_OUT\_LOCATION\_CODE NUMBER(10)
* PUMP\_OUT\_BELOW\_LOCATION\_CODE NUMBER(10)
* PUMP\_IN\_LOCATION\_CODE NUMBER(10)

**AV\_WATER\_USER\_CONTRACT2**. Contains information on water user contracts, without location aliases. Columns are:

* OFFICE\_ID VARCHAR2(16)
* PROJECT\_ID VARCHAR2(289)
* ENTITY\_NAME VARCHAR2(64)
* WATER\_RIGHT VARCHAR2(255)
* CONTRACT\_NAME VARCHAR2(64)
* CONTRACT\_TYPE VARCHAR2(25)
* CONTRACT\_STORAGE\_UNIT VARCHAR2(16)
* CONTRACTED\_STORAGE BINARY\_DOUBLE
* CONTRACT\_EFFECTIVE\_DATE VARCHAR2(11)
* CONTRACT\_EXPIRATION\_DATE VARCHAR2(11)
* INITIAL\_USE\_ALLOCATION BINARY\_DOUBLE
* FUTURE\_USE\_ALLOCATION BINARY\_DOUBLE
* FUTURE\_USE\_PERCENT\_ACTIVATED BINARY\_DOUBLE
* TOTAL\_ALLOC\_PERCENT\_ACTIVATED BINARY\_DOUBLE
* CONTRACTED\_STORAGE\_M3 BINARY\_DOUBLE
* PUMP\_OUT\_LOCATION\_ID VARCHAR2(289)
* PUMP\_OUT\_BELOW\_LOCATION\_ID VARCHAR2(289)
* PUMP\_IN\_LOCATION\_ID VARCHAR2(289)
* PROJECT\_ALIASED\_ITEM VARCHAR2(13)
* PUMP\_OUT\_ALIASED\_ITEM VARCHAR2(13)
* PUMP\_OUT\_BELOW\_ALIASED\_ITEM VARCHAR2(13)
* PUMP\_IN\_ALIASED\_ITEM VARCHAR2(13)
* LOC\_ALIAS\_CATEGORY VARCHAR2(32)
* LOC\_ALIAS\_GROUP VARCHAR2(65)
* PROJECT\_LOCATION\_CODE NUMBER(10)
* PUMP\_OUT\_LOCATION\_CODE NUMBER(10)
* PUMP\_OUT\_BELOW\_LOCATION\_CODE NUMBER(10)
* PUMP\_IN\_LOCATION\_CODE NUMBER(10)

## Deleted Views

**AV\_STREAM\_TYPES**. Underlying table (CWMS\_STREAM\_TYPE) was deleted.

## Modified Views

**AV\_A2W\_TS\_CODES\_BY\_LOC**. Gained columns:

* TS\_CODE\_POWER\_GEN NUMBER
* TS\_CODE\_TEMP\_AIR NUMBER
* TS\_CODE\_TEMP\_WATER NUMBER
* TS\_CODE\_DO NUMBER
* TS\_CODE\_PH NUMBER
* TS\_CODE\_COND NUMBER
* RATING\_CODE\_ELEV\_STOR NUMBER

**AV\_LOCATION\_LEVEL**. Gained columns:

* EXPIRATION\_DATE DATE
* PARAMETER\_TYPE\_ID VARCHAR2(16)
* ATTRIBUTE\_PARAMETER\_ID VARCHAR2(49)
* ATTRIBUTE\_BASE\_PARAMETER\_ID VARCHAR2(4000)
* ATTRIBUTE\_SUB\_PARAMETER\_ID VARCHAR2(4000)
* ATTRIBUTE\_PARAMETER\_TYPE\_ID VARCHAR2(16)
* ATTRIBUTE\_DURATION\_ID VARCHAR2(16)

**AV\_LOC\_CAT\_GROUP**. Gained column LOC\_GROUP\_ATTRIBUTE (NUMBER).

**AV\_RATING**. Gained column TRANSITION\_DATE (DATE).

**AV\_RATING\_LOCAL**. Gained column TRANSITION\_DATE (DATE).

**AV\_TRANSITIONAL\_RATING**. Gained column TRANSITION\_DATE (DATE).

**AV\_VIRTUAL\_RATING**. Gained column TRANSITION\_DATE (DATE).

# Table Changes

## New Tables

**CWMS\_CONFIG\_CATEGORY**. Holds constrained values for AT\_CONFIGURATION.CATEGORY\_ID.

**CWMS\_ENTITY\_CATEGORY**. Holds constrained values for AT\_ENTITY.CATEGORY\_ID.

**CWMS\_GAGE\_TYPE**. Holds constrained values for AT\_GATE\_GROUP.GATE\_TYPE\_CODE.

**CWMS\_USGS\_PARAMETER.** Holds parameter conversion information for converting among USGS, CWMS, and SHEF parameters.

**AT\_CONFIGURATION**. Holds configurations referenced by other objects. Currently referenced by:

* STREAM\_REACH.CONFIGURATION\_CODE.

**AT\_ENTITY**. Holds entities referenced by other objects. Currently referenced by:

* AT\_ENTITY\_LOCATION.ENTITY\_CODE
* AT\_RATING\_SPEC.SOURCE\_AGENCY\_CODE
* AT\_STREAMFLOW\_MEAS.AGENCY\_CODE

**AT\_ENTITY\_LOCATION**. Associates locations with entities for ENTITY location kind.

**AT\_GATE\_GROUP**. Holds gate definitions. An outlet whose rating group is also referenced by this table is considered to be of GATE location kind.

**AT\_OVERFLOW**. Holds information on uncontrolled spillways/weirs. An outlet with an entry in this table is considered to be of OUTLET location kind.

**AT\_PUMP**. Holds descriptions of pump locations. A location with an entry in this table (which also requires an entry in AT\_STREAM\_LOCATION) is considered to be of PUMP location kind.

**AT\_TSV\_COUNT**. Table of unknown purpose with the following columns:

* DATA\_ENTRY\_DATE TIMESTAMP(6) NOT NULL
* INSERTS NUMBER(6) NOT NULL
* UPDATES NUMBER(6) NOT NULL
* DELETES NUMBER(6) NOT NULL
* SELECTS NUMBER(6)

## Deleted Tables

**CWMS\_USGS\_AGENCY**. Use replaced with AT\_ENTITY table.

**CWMS\_STREAM\_TYPE**. Referenced only by previous AT\_STREAM\_REACH table. Not used in current schema.

## Altered Tables

**CWMS\_UNIT\_CONVERSION**. Columns FACTOR and OFFSET are now nullable. Gains column FUNCTION (VARCHAR2 64).

**AT\_A2W\_TS\_CODES\_BY\_LOC**. Gains columns:

* TS\_CODE\_POWER\_GEN NUMBER
* TS\_CODE\_TEMP\_AIR NUMBER
* TS\_CODE\_TEMP\_WATER NUMBER
* TS\_CODE\_DO NUMBER
* RATING\_CODE\_ELEV\_STOR NUMBER
* TS\_CODE\_COND NUMBER
* TS\_CODE\_PH NUMBER

**AT\_LOCATION\_LEVEL**. Gains column EXPIRATION\_DATE (DATE).

**AT\_LOC\_GROUP**. Gains column LOC\_GROUP\_ATTRIBUTE (NUMBER).

**AT\_USGS\_PARAMETER**. Gains new foreign keys:

* OFFICE\_CODE references CWMS\_OFFICE.OFFICE\_CODE
* USGS\_PARAMETER\_CODE references CWMS\_USGS\_PARAMETER.USGS\_PARAMETER\_CODE

**AT\_RATING**. Gains column TRANSITION\_DATE (DATE).

**AT\_RATING\_SPEC**. Column SOURCE\_AGENCY\_CODE (NUMBER(10)) re-keyed to reference AT\_ENTITY.ENTITY\_CODE as constraint for agencies.

**AT\_STREAM\_REACH**. This is a completely redesigned table with the following columns:

* STREAM\_REACH\_LOCATION\_CODE NUMBER(10) NOT NULL
* STREAM\_LOCATION\_CODE NUMBER(10) NOT NULL
* UPSTREAM\_LOCATION\_CODE NUMBER(10) NOT NULL
* DOWNSTREAM\_LOCATION\_CODE NUMBER(10) NOT NULL
* CONFIGURATION\_CODE NUMBER(10) NOT NULL
* COMMENTS VARCHAR2(256)

**AT\_STREAMFLOW\_MEAS**. Column AGENCY\_ID (VARCHAR2(6)) changed to AGENCY\_CODE (NUMBER(10)) in order to reference AT\_ENTITY.ENTITY\_CODE as constraint for agencies.

**AT\_TRANSITIONAL\_RATING**. Gains column TRANSITION\_DATE (DATE).

**AT\_VIRTUAL\_RATING**. Gains column TRANSITION\_DATE (DATE).

**AT\_WATER\_USER\_CONTRACT**. Columns PUMP\_OUT\_LOCATION\_CODE, PUMP\_OUT\_BELOW\_LOCATION\_CODE, and PUMP\_IN\_LOCATION\_CODE (each NUMBER(10))k re-keyed to reference AT\_PUMP.PUMP\_LOCATION\_CODE as constraint for locations.