Drain Package

Input to the Drain (DRN) Package is read from the file that has type "DRN" in the Name File. Optional variables are shown in brackets. All variables are free format if the option “FREE” is specified in the Basic Package input file; otherwise, the non-optional variables have 10-character fields and the optional variables are free format.

New input for MODFLOW-MAXDRN is specified in **bold red.**

FOR EACH SIMULATION

`0. [#Text]`

Item 0 is optional—“#” must be in column 1. Item 0 can be repeated multiple times.

`1. [`***`PARAMETER`*** `NPDRN MXL]`

This optional item must start with the word “PARAMETER”.

`2. MXACTD IDRNCB [`**`Option`**`]`

`3. [PARNAM PARTYP Parval NLST [`***`INSTANCES`*** `NUMINST]]`

Repeat Item 3 combined with the indicated repetitions of Item 4 NPDRB times. Items 3 and 4 are not read if NPDRN is negative or 0. If PARNAM is to be a time-varying parameter, the keyword “INSTANCES” and a value for NUMINST must be entered.

`3b. [QMAXP]`

`4a. [INSTNAM]`

`4b. [Layer Row Column Elevation Condfact [xyz] ]`

After each Item 3 for which the keyword “INSTANCES” is not entered, read Item 4b and not Item 4a. After each Item 3 for which the keyword “INSTANCES” is entered, read Item 4a and Item 4b for each instance.

NLST repetitions of Item 4b are required; they are read by subroutine ULSTRD. (SFAC of the ULSTRD utility subroutine applies to Condfact). The NLST repetitions of Item 4b follow each repetition of Item 4a when PARNAM is time varying.

FOR EACH STRESS PERIOD

`5. ITMP NP`

`6. Layer Row Column Elevation Cond [xyz]`**`[QMAX]`**

ITMP repetitions of Item 6 are read by subroutine ULSTRD if ITMP > 0. (SFAC of the ULSTRD utility subroutine applies to Cond.) Item 6 is not read if ITMP is negative or 0.

`7. [Pname [Iname] ]`

(Item 7 is repeated NP times. Item 7 is not read if NP is negative or 0. Iname is read if Pname is a time-varying parameter.)

Explanation of Variables Read by the DRN Package:

Text—is a character variable (199 characters) that starts in column 2. Any characters can be included in Text. The"#" character must be in column 1. Lines beginning with # are restricted to the first lines of the file. Text is written to the Listing File.

NPDRN—is the number of drain parameters.

MXL—is the maximum number of drain cells that will be defined using parameters.

MXACTD—is the maximum number of drain cells in use during any stress period, including those that are defined using parameters.

IDRNCB—is a flag and a unit number.

> If IDRNCB > 0, cell-by-cell flow terms will be written to this unit number when "SAVE BUDGET" or a nonzero value for ICBCFL is specified in Output Control.
> If IDRNCB = 0, cell-by-cell flow terms will not be written.
> If IDRNCB < 0, drain leakage for each drain cell will be written to the listing file when "SAVE BUDGET" or a non-zero value for ICBCFL is specified in Output Control.

Option—is an optional list of character values.

> "AUXILIARY abc" or "AUX abc"— defines an auxiliary variable, named "abc", which will be read for each drain as part of Items 4 and 6. Up to 20 variables can be specified, each of which must be preceded by
> "AUXILIARY" or "AUX." These variables will not be used by the Ground-Water Flow Process, but they will be available for use by other processes. The auxiliary variable values will be read after the Cond variable.
> "NOPRINT"—specifies that lists of drains will not be written to the Listing File.
>
> **"QMAX" — specifies that MODFLOW-MAXDRN is active. Item 3b and/or QMAX in item 6 must be specified. Note that there is no error check for this, i.e. the user must make sure these variables are accounted for when QMAX is active (or omitted when QMAX is not active).**

PARNAM—is the name of a parameter. This name can consist of 1 to 10 characters and is not case sensitive. That is, any combination of the same characters with different case will be equivalent.

PARTYP—is the type of parameter. For the DRN Package, the only allowed parameter type is DRN, which defines values of the drain hydraulic conductance.

Parval—is the parameter value. This parameter value may be overridden by a value in the Parameter Value File.

NLST—is the number of drain in a non-time-varying parameter. For a time-varying parameter, NLST is the number of drain cells in each instance.

QMAXP — A flag and real number. Must be read when QMAX keyword is active.

QMAXP ≥ 0, QMAXP is the maximum drain discharge for all drains for this parameter.

QMAXP < 0, all drains for this parameter have an unlimited discharge (i.e. the original drain implementation). The value of QMAXP is read but not used.

INSTANCES—is an optional keyword that designates a parameter as time varying. The keyword is not case sensitive; that is, any combination of the same characters with different case can be used. If ***INSTANCES*** is present, it must be followed by a value for NUMINST. If ***INSTANCES*** is absent, PARNAM is non-time-varying and NUMINST should not be present.

NUMINST—is the number of instances for a time-varying parameter, where each instance is a list of river reaches and associated properties. If the keyword ***INSTANCES*** is present, it must be followed by a value for NUMINST. If ***INSTANCES*** is absent, NUMINST should not be present.

INSTNAM—is the name of an instance associated with the parameter named in the corresponding Item 3. The instance name can be 1 to 10 characters and is not case sensitive. That is, any combination of the same characters with different case will be equivalent. Instance names must be unique for a parameter, but instance names may be reused for different parameters.

Layer—is the layer number of the cell containing the drain.

Row—is the row number of the cell containing the drain.

Column—is the column number of the cell containing the drain.

Elevation—is the elevation of the drain.

Condfact—is the factor used to calculate drain hydraulic conductance from the parameter value. The conductance is the product of Condfact and the parameter value.

[xyz]—represents the values of the auxiliary variables for a drain that have been defined in Item 2. The values of auxiliary variables must be present in each repetition of Items 4 and 6 if they are defined in Item 2. The values must be specified in the order used to define the variables in Item 2.

ITMP—is a flag and a counter.

If ITMP < 0, non-parameter drain data from the last stress period will be reused.
If ITMP ≥ 0, ITMP will be the number of non-parameter drains read for the current stress period.

NP—is the number of parameters in use in the current stress period.

Cond—is the hydraulic conductance of the interface between the aquifer and the drain.

QMAX — A flag and real number. Must be read when QMAX keyword is active.

QMAX ≥ 0, QMAX is the maximum drain discharge for this drain.

QMAX < 0, the drain has an unlimited discharge (i.e. the original drain implementation). The value of QMAX is read but not used.

Pname—is the name of a parameter that is being used in the current stress period. NP parameter names will be read.

Iname—is an instance name that is read only if Pname is a time-varying parameter. Multiple instances of the same parameter are not allowed in a stress period.