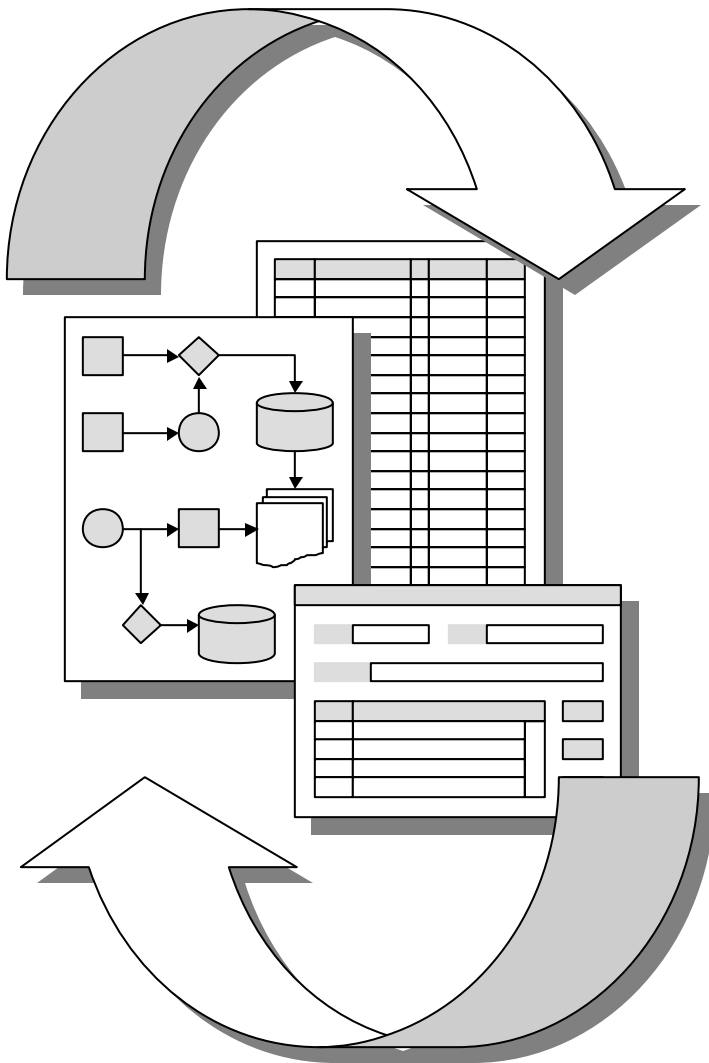


Software Requirements Specification

GASB: Data Warehouse and Reporting



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1. Project Team

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2. Overall Description

2.1 Description of Need

The Controller's Division is responsible for preparation of the University's financial statements. In previous years these statements have been produced on the basis of "fund accounting". However, there are new GASB reporting requirements that dictate the statements be produced in a manner similar to the private sector based on "entity". While we must adhere to the new GASB standards for external reporting required for bond ratings and NSF funding, there is a need to continue to do the fund reporting internally. In order to accommodate the above, changes have been made to the online and batch portions of FRS to add new elements on the accounts that will help in the identification of which accounts appear on different portions of the financial statements.

This requirements document details:

- the data (IDMS and non-IDMS) to be extracted, and the logic for that extraction, into the Data Warehouse for production of the financial statements,
- the logic and format for creation of the business rules for allocating the account information to the "cells" on the financial statements,
- the format of the new financial statements,
- procedures and logic for the creation of the financial statements.

NOTE: See Attachment IX – GASB Data Flow for a visual representation of the flow of all data from its source to its reflection on the financial statements.

The results and/or functions provided within the scope of this project include:

- easily accessible data in the Warehouse for the production of the financial statements,
- provision of high quality data in the Warehouse, with required error reports for data quality violations and timely data correction by Controller's Division staff,
- an automated method of maintaining the required IDMS, non-IDMS (external) financial data, business rule data, and the financial statement text table in the Warehouse, including upload/update/replace options, an automated method of assigning new attributes to the account records in the Warehouse to identify the one or more "cells" on the financial statements to which they apply, resulting in the ability to access the detail account information behind each of the cells on the financial statements,
- an automated method for reapplying current year previous month(s) transactions based on new/revised business rules,
- an automated method of producing timely, and retrieving historical, financial statements (monthly and year-end) throughout the year, rather than strictly at year-end,
- production in the Data Warehouse (each time the financial statements are produced) of an audit trail on which transactions were used in the calculation of the amounts for specific cells on the financial statement,
- creation of month-end and year-end "**summary record**" snapshots (based on the processing month and year) of the accounting data for historical trends analysis, as well as the detail on the non-IDMS external financial data, business rules and financial statement text table.

NOTE: The Controller's Division will write any detail reports required to analyze the summary information on the financial statements.

This project does not include the provision of additional functionality the campus community may desire for the analysis and reporting of accounting information. These will be addressed in subsequent data warehouse/mart projects.

2.2 User Classes

The following types of user roles will exist within the GASB Data Warehouse module:

- The **Controller's staff** will have two types of users:
 - those who need only view/reporting access to **all** data required for producing the financial statements, as well as viewing the statements themselves,
 - those who need view/reporting access to **all** data required for producing the financial statements, the ability to update the non-IDMS financial, business rules and financial statement text data , and the ability to run the financial statements.
- The **Budget Office staff** will need only view/reporting access to **all** data required for producing the financial statements, as well as viewing the statements themselves.
- The **Computing Technical staff** supporting this project will have full access (view and update) to **all** data required for producing the financial statements.
- The general campus users will also need access to view and report on all the accounting data used to produce the financial statements.

2.3 Operating Environment

The database for this project will be an Oracle database to be created, stored, and maintained by Computing Services. The database will reside on the Oracle Data Warehouse server (QUANTUM) within Computing Services. This server is currently an IBM RS6000 S7A running AIX 4.3.0.

Batch processing to upload/update the data will be done using Oracle tools or PL/SQL. Reports against the data in the Warehouse can be done with any ODBC compliant desktop tool such as Microsoft Access, MS Query, Brio, SAS, and Crystal Reports. The non-IDMS (external) financial data, business rules and financial statement text tables will be maintained in EXCEL and then uploaded into the Warehouse. The program(s) used to produce the actual financial statements will be written in a flexible reporting language, such as WebFOCUS or SAS.

2.4 Design/Implementation Constraints

The programs to add new elements to the account information in the Warehouse and to produce the financial statements cannot be completed until the Controller's Division creates the business rules.

The goal is to have this project completed **no later than 7/1/02, excluding the archival and retrieval process requested in this document.** (The resource to develop the archival and retrieval process will be extensive, given the request the Controller's Division be able to retrieve any year-end data snapshot, regardless of age.) While the GASB requirements are effective July 1, 2001, we do not need to produce the final financial statements until the processing of the 01-02 year end. However, the above deadline will be greatly affected by the time it takes to define the business rules noted above, and to also identify, define and collect the non-IDMS financial data required for the financial statements.

The format of the financial statements will likely change over time, so the design of the method of allocating the account information to the statement cells must be flexible to accommodate such future changes. For example, codes and/or element names should not reference particular "positions" or row and line numbers on a given financial statement.

2.5 Sign-Off on Section 2 – Overall Description

By signing below, you certify that you have read, fully understand, and agree with the contents section 2 – **Overall Description** of this document, and any Attachments referenced within. Changes made to the requirements after this date must be agreed upon in writing, and will affect the project timeline.

| <i>Printed Name/Title</i> | <i>Signature</i> | <i>Date</i> |
|---------------------------|------------------|-------------|
| _____ | _____ | _____ |
| <i>Printed Name/Title</i> | <i>Signature</i> | <i>Date</i> |
| _____ | _____ | _____ |
| <i>Printed Name/Title</i> | <i>Signature</i> | <i>Date</i> |
| _____ | _____ | _____ |
| <i>Printed Name/Title</i> | <i>Signature</i> | <i>Date</i> |

3. External Interface Requirements

3.1 User Interfaces

There will be no special user interface required. As noted above, reports against the data in the Warehouse can be done with any ODBC compliant desktop tool such as Microsoft Access, MS Query, Brio, and Crystal Reports. The business rules tables, the non-IDMS (external) financial data and the financial statement text data will be maintained in EXCEL, and then uploaded into the Data Warehouse. The Controller's Division will upload these files to their file server, and then schedule the jobs to FTP the files from their file server to the Data Warehouse Server. Users in the Controller's Division should also be able to schedule the reload of the data based on new or revised business rules, or changes in the non-IDMS (external) or financial statement text data. They should also be able to schedule the production of the monthly and year-end financial statements, and both should be available in both print and electronic (comma delimited file) format. Furthermore, they should be able to schedule the month-end and year-end snapshots of the data identified in **4.2**

3.2 Software Interfaces

The application resulting from this project will contain procedures that will extract information from IDMS and upload the data in Oracle. There will also be three separate jobs to FTP and subsequently upload/update/"reapply" business rules: (1) the non-IDMS (external) financial data, (2) financial statement text data and (3) business rules data. Additional programs/procedures will apply the business rules to both IDMS (internal) and non-IDMS (external) financial records, produce the required data quality reports, produce all required variations of the institution's financial statement, and address the archival/retrieval functions in **4.2**.

3.3 Sign-Off on Section 3 – External Interface Requirements

By signing below, you certify that you have read, fully understand, and agree with the contents section **3 – External Interface Requirements** of this document, and any Attachments referenced within. Changes made to the requirements after this date must be agreed upon in writing, and will affect the project timeline.

| <i>Printed Name/Title</i> | <i>Signature</i> | <i>Date</i> |
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| <i>Printed Name/Title</i> | <i>Signature</i> | <i>Date</i> |
| _____ | _____ | _____ |
| <i>Printed Name/Title</i> | <i>Signature</i> | <i>Date</i> |
| _____ | _____ | _____ |
| <i>Printed Name/Title</i> | <i>Signature</i> | <i>Date</i> |
| _____ | _____ | _____ |

4. System Features

4.1 GASB Data Warehouse Element Identification

4.1.1 Description and Priority

Information Technology will create and maintain an Oracle database to store the accounting data required for the financial statements. They will house the database on a server within Computing Services, and will support both the database and the server, including system backups. This project has a **high priority** since it is a regulatory issue.

4.1.2 Action/Response Sequences

The Data Warehouse database will contain the accounting records, but will not be updated directly by any user. While the Controller's Division may update the non-IDMS financial, business rule and financial statement text data in their EXCEL spreadsheets, they will need to schedule jobs developed by the DBAs to get the corresponding data updated in the Warehouse. All update access to the database will be handled through the DBAs, where appropriate security will be enforced. Extracts from IDMS should be scheduled through the normal daily production process.

4.1.3 Functional Requirements

REQ-4.1.3.1:

This section of the requirements document will detail the pieces of information that need to be captured in the Data Warehouse to address GASB reporting requirements.

REQ-4.1.3.2 (IDMS Element Identification):

Elements associated with the general ledger (FG), subsidiary ledger (FS) and account transactions (FT) need to be in the Warehouse. Also, the inclusion of the FO encumbrance records would allow the production of the normal monthly reports. See **4.3.3.1** for a discussion of the logic required to load this data into the Data Warehouse.

NOTE: The internal IDMS elements noted below are contained in **Attachment I – GASB FRS Elements**. This spreadsheet contains the system name (SYSNAME), element synonym (SYNNAME), element COBOL name (COBOLNAME), element title (TITLE) and element description (SEQNO plus DTEXT). (This spreadsheet contains multiple lines of description for many elements, and the SEQNO indicates the line number of the description. Since this spreadsheet is used to update the element definitions in IDMS, if an element definition has more than one line, then the element will be listed in each row for the additional lines of the definition. Consequently, many element names and titles appear to be duplicated in the left of the spreadsheet, because of the multiple lines of text in the right columns of the spreadsheet.) **The previously noted spreadsheet is static, and may not include all of the newest FRS elements. Consequently, when the actual programming is done to extract the FRS IDMS data noted below, any discrepancies between the elements included in the Attachment I spreadsheet and those included in IDMS, should be noted and discussed with Data Administration and the Controller's Division to ensure any new elements are included in the extract.**

NOTE: Additional "masking" elements identified in **Attachment VIII – Additional GASB Mask Elements**, need to be created in the Oracle extract to facilitate reporting and analysis by the Controller's Division staff. The elements identified in **Attachment VIII** are not currently defined in IDMS.

General Ledger (FG)

- These elements are identified in rows 2 through 421 in the attached **Attachment I - GASB FRS Elements** spreadsheet.

Open Commitment (FO)

- These elements are identified in rows 422 through 455 in the attached **Attachment I - GASB FRS Elements** spreadsheet.

Subsidiary Ledger (FS)

- These elements are identified in rows 456 through 2,071 in the attached **Attachment I - GASB FRS Elements** spreadsheet.

Account Transactions (FT)

- These elements are identified in rows 2,072 through 2,196 in the attached **Attachment I - GASB FRS Elements** spreadsheet.

REQ-4.1.3.3 (External Financial Element Identification):

The records containing the external data should include the elements identified in **Attachment II - GASB External Financial Data**. See **4.3.3.1** for a discussion of the logic required to load this data into the Data Warehouse.

NOTE: The external transactions should contain the same “mask” elements as the corresponding elements on the internal transactions, including the additional elements identified in Attachment VIII. These mask elements will be required for reporting purposes.

REQ-4.1.3.4 (Business Rule Element Identification):

NOTE: The Business Rule table defined in Attachment III – GASB Business Rules, and the logic for uploading and applying the business rules in section 4.3, are meant to identify critical elements in the decisions regarding calculation of the amounts in the financial statement cells. However, the actual design of the Business Rule spreadsheet to be maintained by the Controller’s Division may be changed as the Database Administrators refine the technical design. Whatever the final design, there will be a spreadsheet containing some form of business rules the users will maintain, and can schedule to be uploaded and reapplied to the financial data as needed.

The elements in the Business Rule records are contained in **Attachment III – GASB Business Rules**. (**NOTE:** Only those elements identified with a “Y” in the “On Data File?” column will actually be columns on the spreadsheet of the business rules the Controller’s Division uploads. Those elements identified with an “I” in the “On Data File?” column are “mask” elements whose values are identified with the use of the required “*” in the appropriate character(s) of the primary element name as specified in the “Comments” column in Attachment III.) The business rules will be used to determine to which “cells” on the financial statements the amounts on the IDMS account records noted above in **4.1.3.2** and the external financial transactions noted above in **4.1.3.3** should apply. **Consequently, there will be additional elements in the database that associate the account detail and summary records with the financial statement cell.** (See **4.3** below for more information.)

NOTE: When users are entering the operands in conjunction with the values of the element for comparison, they need to make sure that if an element is defined as an alpha field, all leading zeroes in the value are specified. However, if it is a numeric field, leading zeroes do not need to be entered. For example, an alpha field such as Corporation may be “NE02”, but if it had been defined as a numeric

field, 'NE2' would be fine. Furthermore, the decimal should be entered in the business rule spreadsheet for the Amount Value.

REQ-4.1.3.5 (Financial Statement Text Table):

The elements in the Financial Statement Text Table are defined below, and illustrated in **Attachment VII – Sample Financial Statement Text Table**. The Text Table is linked to the Business Rules in the production of the specific financial statements based on a unique key assigned at the time the data is loaded into the Data Warehouse. From the users' perspective, this link will be based on a combination of the Year, Form ID, 2nd Report Level, 3rd Report Level, 4th Report Level, 5th Report Level and 6th Report Level. **Each row in the spreadsheet in Attachment VII should contain a unique combination of these elements.**

1. **Year** – Format is CCYYCCYY, where the first four digits are the starting year and the last four the ending year.
2. **Form ID** – Format is X(10). Code indicating the specific statement. (See **4.4.3.1** or **Attachment III** for the valid values.)
3. **Cell Identifier** – Format is X(20). Abbreviated identifier for cell that is unique within each Form ID.
4. **2nd Report Level** – Format is X(10). Code indicating second report level or section ID.
5. **3rd Report Level** - Format is X(10). Code indicating third report level or sub-section ID.
6. **4th Report Level** – Format is X(10). Code indicating fourth report level or line ID.
7. **5th Report Level** - Format is X(10). Code indicating fifth report level or secondary line ID.
8. **6th Report Level** - Format is X(10). Code indicating sixth report level or last line ID.
9. **Text** – Format is X(100). Actual text to appear beside amounts in the respective financial statement cells.
10. **Underline Indicator** – Format is X(1). Code indicating if the amount in the respective cell should be underlined (value of 'Y') or if a "double underline" is required (value of "D").
11. **Amount Required** – Format is X(1). Code indicating if the line of text has an amount field associated with it (value of "Y") or if it is simply a line of text (value of "N").
12. **Print on Statement** – Format is X(1). Code indicating if the amount should be printed on the financial statement (value of "Y"), or if it is just a temporary cell that will not be printed on the statement (value of "N").
13. **Comments** – Format is X(100). Text indicating the formula for calculating the cell as a sum or difference of other cells within the same statement, or as a link to cell(s) on other statements.

4.1.4 Sign-Off on Section 4.1 – GASB Data Warehouse Element Identification

By signing below, you certify that you have read, fully understand, and agree with the contents section **4.1 – GASB Data Warehouse Element Identification** of this document, and any Attachments referenced within. Changes made to the requirements after this date must be agreed upon in writing, and will affect the project timeline.

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4.2 GASB Data Warehouse Update and Storage Requirements

4.2.1 Description and Priority

An automated means of creating, updating, archiving and purging the data noted above in 4.1.3 in the Data Warehouse needs to be created by Information Technology. This section of the requirements document will detail the frequency of updates to the Data Warehouse, amount of data that will need to be retained online in the Warehouse, and the retention requirements and rules for archiving or purging data from the Warehouse.

4.2.2 Action/Response Sequences

Jobs to update, archive and/or purge data should be scheduled by the users in the Controller's Division, but executed by the DBAs or as part of the normal production process. The update of the business rule table will always be a complete overlay. **There needs to be a table created in the Data Warehouse the Controller's Division will maintain to indicate which year is considered prior, current and future to be used in the update, archive and/or purge of data.**

4.2.3 Functional Requirements

REQ-4.2.3.1 (Frequency of Updates):

- Current fiscal year detail (FT) and summary (FO, FG and FS) data should be updated on a nightly basis in the Data Warehouse environment. This should include the "Month to Date" and "Year to Date" transactions. **The table noted above should be used to determine which year is current, prior and future. However, an additional snapshot of these records needs to be taken for GASB reporting usage, and this snapshot should be scheduled by the users based on a fiscal year parameter. This extra GASB snapshot will stay frozen until the users have resolved any problems with the financial statements resulting from the data.**
- Historical/prior year data should not need to be updated *past September* of the current fiscal year. **NOTE: Four months of the year (June – September) there are two years (current and preceding) available in FRS.**
- External financial transactions, financial statement text data, and business rule data should be updated upon request from the user. This data will be collected and maintained by the Controller's Division in a spreadsheet that will contain only one year of data.
- The Controller's Division would like a detailed "audit trail" of the account records tagged to the cells on the financial statements at the time they request them. They would like this audit trail physically stored in the Data Warehouse, and "blown away" the next time the financial statement is rerun. (See 4.4 for more details.)
- The users would like data archived to an offline storage device to be available/restored **within 4 hours** of when the user initiates the request. However, the actual time of archival will be largely determined by technical issues (disk/tape retrieval, different file formats, maintenance on extensive retrieval process, etc.) and disaster recovery requirements (offline storage location, etc.). **Given the extensive resources to develop such an archival and retrieval process, these functions will not be available by the initial 7/1/02 deadline. In order to simplify the retrieval process, the Controller's Division has agreed to never change the name or format of an existing element required for GASB reporting, and only add new elements over time. Furthermore, they will only request to retrieve one fiscal year of historical data at a time.**

REQ-4.2.3.2 (Online/Offline Storage and Retention Requirements):

Detail transactions in FRS are the FT transactions. **Summary** records are the FO, FG and FS. A **snapshot** refers to a copy of all of the above transactions. The audit trail from the financial statements should also be included as part of the month-end and year-end snapshot process.

NOTE: All data quality issues identified in the reports specified in REQ-4.5.3.1 must be resolved before any month-end or year-end snapshot can be taken.

The Controller's Division has requested the following **online storage** for the Data Warehouse for data starting with the 00-01 fiscal year.

1. Detail and summary data on a "through last night" basis for the current fiscal year. This should include year-to-date transaction activity.
2. Detail and summary data on a "through last night" basis for prior or future fiscal year (or both), based upon the fiscal years available in IDMS. (Currently we have either current, current and prior, or current and future, fiscal years in IDMS. Should UK choose to maintain three fiscal years in IDMS, the users would want to have prior, current, and future fiscal years available as of "last night". This should include year-to-date transaction activity. **The current year-to-date amounts are the prior month year-to-date plus the current month transactions.**)
3. The four most recent years of June year-end "snapshots".
4. The four most recent years of June year-end business rules.
5. The four most recent years of June external financial data.
6. The four most recent years of June financial statement text data.
7. The four most recent years of June financial statement output.
8. 15 most recent months of month-end "snapshots".
9. 15 most recent months of business rules.
10. 15 most recent months of external financial data.
11. 15 most recent months of financial statement text data.
12. 15 most recent months of financial statement output.

The items 3-7 could be used to re-create any of the June year-ends in totality, as it existed when the year ended. The last five items could be used to re-create any of the month-ends in totality, as it existed when the month ended.

NOTE: Due to timing issues, the Controller's staff must be able to schedule the jobs for items 3-12 above to archive the data (i.e. take a "snapshot" of the data in the Warehouse). Parameters for these jobs should include the Internal/External Indicator, Fiscal Year, Month (for Month-End archive), and the date the archive is to take place. Users will therefore be able to archive the internal and external data separately, and pick and choose which tables and for which year and month data are archived. The timing for the archiving of the internal versus external data will vary due to the need for adjustments.

The Controller's Division has requested the following **offline storage** for the Data Warehouse:

1. For years no longer maintained online, within the rules noted above, the June year-end snapshots of data, business rules, financial statement text data and external data **should be maintained indefinitely**. An automated mechanism to reload this data for reporting with minimal effort by the user needs to be available.
2. Data noted above that "expires" and does not fall into the previous category, can be deleted from the Data Warehouse and does **NOT** need to be archived to offline storage for any period of time.

4.2.4 Sign-Off on Section 4.2 – GASB Data Warehouse Update and Storage Requirements

By signing below, you certify that you have read, fully understand, and agree with the contents section **4.2 – GASB Data Warehouse Update and Storage Requirements** of this document, and any Attachments referenced within. Changes made to the requirements after this date must be agreed upon in writing, and will affect the project timeline.

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Signature

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Printed Name/Title

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4.3 GASB - Logic for Loading Internal and External Data, and for the Financial Statement Business Rule Application

4.3.1 Description and Priority

Information Technology needs to establish an automated means to:

1. extract the internal IDMS data noted above in **4.1.3.2**, and load it into the Data Warehouse,
2. upload the external financial noted above in **4.1.3.3**, the business rule data above in **4.1.3.4**, and the financial statement text table in **4.1.3.5** into the Data Warehouse, and
3. of accumulating/assigning the amount data on the account records noted above in **4.1.3.2** and **4.1.3.3** in the appropriate cells on the financial statement based on the business rules described in **4.1.3.4**.

This section of the requirements document will explain the logic and process for this determination for the initial creation of the account information in the Data Warehouse, as well as the replacement process if the business rules are corrected/changed.

4.3.2 Action/Response Sequences

Users in the Controller's Division will supply the external financial data, business rules data and financial statement text data that will be used as a basis for allocating the amounts on the accounting records to the appropriate cells on the financial statements, and printing the appropriate text beside them. They will maintain this data in EXCEL spreadsheets, and produce output from the spreadsheets as a comma-delimited file with the elements listed in the order and format presented in **Attachment II, Attachment III** and **4.1.3.5** respectively. **The Controller's Division is responsible for uploading the required files to their file server and notifying the DBAs (via a standard scheduling process) when the data needs to be uploaded/updated in the Data Warehouse.** OCT staff will upload the comma-delimited files to the following directories on their file server: (1) external financial data will be in the 'GASBDW/External' folder and the file named GASB_ext.dat, (2) business rule data will be in 'GASBDW/BR' folder and files named CONS_BRrule.dat, THRI_BRrule.dat, UKAA_BRrule.dat, UKRF_BRrule.dat, FUND_BRrule.dat, ERF_BRrule.dat, HF_BRrule.dat, ME_BRrule.dat, BPF_BRrule.dat, COA_BRrule.dat, HCCS_BRrule.dat, LCC_BRrule.dat, HD_BRrule.dat, and UKOnly_BRrule.dat, and (3) the financial statement text data will be in 'GASBDW/Text' folder and files named CONS_Text.dat, THRI_Text.dat, UKAA_Text.dat, UKRF_Text.dat, FUND_Text.dat, ERF_Text.dat, HF_Text.dat, ME_Text.dat, BPF_Text.dat, COA_Text.dat, HCCS_Text.dat, LCC_Text.dat, HD_Text.dat, and UKOnly_Text.dat. There will be a separate job to load each file, so that only the file that has been changed needs to be uploaded. **(NOTE: OCT will have up to 14 separate files in each folder that will need to be concatenated into one table in the Data Warehouse.)** When new account records are loaded into the Data Warehouse either from the internal IDMS data or the external financial transactions, the data in the business rules should be used to determine which cells on the financial statements they affect, and the account records should be "tagged" with the business rule numbers which apply to them. These business rule tags will be used to produce the statements identified in **4.4.1** below, and as a basis for auditing the detail records behind the summary figures on the financial statements.

4.3.3 Functional Requirements

REQ-4.3.3.1 (Load of Internal and External Financial Account Records):

Jobs need to be written to extract the FRS records noted in **4.1.3.2 (see Attachment I)**, the external financial records identified in **4.1.3.3 (see Attachment II)**, the business rules in **4.1.3.4 (see Attachment III)**, and the financial statement text table **4.1.3.5 (see Attachment VII)**.

When the **internal IDMS records** are extracted and loaded into the Data Warehouse the following transformations need to be made to the data:

1. All fiscal year fields should be expanded to include a four-digit year (01-02 would be 20012002) and each internal record should have a fiscal year element.

2. A one-character flag needs to be added to the records to indicate they are internal IDMS data (default to "I" for internal).
3. The subsidiary ledger (FS) account records containing multiple PCS codes need to be broken apart so that each record only has one PCS code, the corresponding PCS percentage, and the amount on the record is the product of the PCS percentage and the total amount on the original FS account record. If the sum of these PCS percentages and amounts on the individual records does not equal 100% and the total amount on the original FS accounting record due to rounding issues, then the difference should be included in the percentage and amount on the first PCS record. The latter change will eliminate the need for the users to do the PCS code calculations.
4. All "masks" identified in **Attachment III – GASB Business Rules** should have the corresponding FRS and external transaction elements defined in the Data Warehouse, even if they are not defined in IDMS.
5. All other date fields should be of the format CCYYMMDD.

See 4.5.3 for various data quality tests that need to be run prior to and/or during the loading of transactions into the Data Warehouse.

NOTE: The internal IDMS elements are contained in **Attachment I – GASB FRS Elements**. This spreadsheet contains the system name (SYSNAME), element synonym (SYNNAME), element COBOL name (COBOLNAME), element title (TITLE) and element description (SEQNO plus DTEXT). (This spreadsheet contains multiple lines of description for many elements, and the SEQNO indicates the line number of the description. Since this spreadsheet is used to update the element definitions in IDMS, if an element definition has more than one line, then the element will be listed in each row for the additional lines of the definition. Consequently, many element names and titles appear to be duplicated in the left of the spreadsheet, because of the multiple lines of text in the right columns of the spreadsheet.) **The previously noted spreadsheet is static, and may not include all of the newest FRS elements. Consequently, when the actual programming is done to extract the FRS IDMS data noted below, any discrepancies between the elements included in the Attachment I spreadsheet and those included in IDMS, should be noted and discussed with Data Administration and the Controller's Division to ensure any new elements are included in the extract.**

The source of the **external financial records** will be a spreadsheet supplied by the Controller's Division. The Controller's Division will populate all of the required fields as determined by the corresponding required elements on the internal FRS records, and the application of the business rules for the production of the financial statements. The Controller's Division would like these external records to ultimately be "merged", either physically or logically, with the internal records in the Data Warehouse for "ease of processing" and reporting. When the external records are extracted and loaded into the Data Warehouse the following transformations need to be made to the data: (1) creation of the external transactions should follow the logic in **Attachment II**, and (2) the corresponding FT transaction should be created along with the FG or FS record reflected in the spreadsheet. The latter is required to ensure the detail (FT) records can be summed to equal the amounts on the corresponding FG or FS record. **Because it will be possible to have multiple external transactions affecting the same account number within one year, it will be necessary to sum all of the external FT transactions by Account, Subcode and Fiscal Year to determine the correct amount to put on the corresponding FG or FS records. See 4.5.3 for various data quality tests that need to be run prior to and/or during the loading of transactions into the Data Warehouse.**

There are some fields associated with the external financial data that have no corresponding elements in FRS, and therefore cannot be physically merged with the data in the Data Warehouse. For user ease, views to the Oracle database will make the internal and external financial records appear to be of the same format and within the same table. However, the physical design of the database tables will be different, to accommodate the elements associated with the external financial data that have no corresponding element in FRS. These elements are identified in **Attachment II**.

The source of the **business rule records** will be a spreadsheet supplied by the Controller's Division (see **Attachment III**). **(NOTE: Only those elements identified with a "Y" in the "On Data File?" column will**

actually be columns on the spreadsheet of the business rules the Controller's Division uploads. Those elements identified with an "I" in the "On Data File?" column are "mask" elements whose values are identified with the use of the required "*" in the appropriate character(s) of the primary element name as specified in the "Comments" column in Attachment III.) The Controller's Division will populate all of the required fields as determined by the corresponding required elements on the internal FRS records, and the application of the business rules for the production of the financial statements. **See 4.5.3 for various data quality tests that need to be run prior to and/or during the loading of transactions into the Data Warehouse.**

REQ-4.3.3.2 (Application of Business Rules):

NOTE: The Business Rule table defined in Attachment III – GASB Business Rules, and the logic for uploading and applying the business rules in 4.3, are meant to identify critical elements in the decisions regarding calculation of the amounts in the financial statement cells. However, the actual design of the Business Rule spreadsheet to be maintained by the Controller's Division may be changed as the Database Administrators refine the technical design. Whatever the final design, there will be a spreadsheet containing some form of business rules the users will maintain, and can schedule to be uploaded and reapplied to the financial data as needed.

The rows in the business rule table in **Attachment III** reflect the logic to be used in determining which "cells" on the financial statements will be affected by the account records. An account record applies to the cells identified in the rule as a combination of the Form ID, Second Report Level, Third Report Level, Fourth Report Level, Fifth Report Level and Sixth Report Level. The account record "applies" to the cell if the values on the corresponding elements on the account record(s) are consistent with the values represented in the business rules. If the account record meets these criteria and thus "applies" to the cell identified within the business rule, then the account record should be "tagged" with the business rule within the Data Warehouse. This "tagging" should take place when the external or internal data (in the "GASB snapshot" noted above) is originally loaded into the Data Warehouse, as well as when the Controller's Division makes a change to the business rules and requests the data be "retagged".

NOTE: While the "tagging" will be done at the account summary (FG or FS) level, the Warehouse design should allow the users to report on the detail (FT) associated with these records by business rule or one of its elements. For instance, the design should allow the user to report the detail (FT) records that are affected by a specific business rule, as well as being able to report on the summary (FG or FS) records associated with that rule.

NOTE: The relationship between the columns within one business rule is an "AND", while the relationship between business rule "rows" is an "OR".

If there is no value in an element within the business rule, then it is assumed that element can be ignored in the application of that rule.

In order for the business rule apply to the account record:

- If the **Replace Flag** has a value of "L", then this means this rule does not need to read any internal or external financial data, but is rather an indication of a statement cell's value being determined by the value in another/other preceding statement's cell. In this case, the business rule will simply indicate which financial statement cell should be used to determine this value, based on the values in **Reference – Form ID, Reference – Second Report Level, Reference – Third Report Level, Reference – Fourth Report Level, Reference – Fifth Report Level, and Reference – Sixth Report Level.**

NOTE: If there are multiple active rules for the same statement cell using a link option, and they are effective for the same time period, then the values in all the linked cells (identified by the “Reference” elements above) should be summed to determine the value to place in the cell to which the rule applies. For example, if a business rule for “Cell 100” says to link to “Cell 50” and another active rule for “Cell 100” says to link to “Cell 75”, then the value of “Cell 100” should be the sum of “Cell 50” and “Cell 75”.

- If the **Replace Flag** has a value of “F”, then this means the business rule is so complicated it cannot be defined within the normal structure of the Business Rule Table, and must be “free-formed”. In this case the formula specified in the **Complex Logic Formula** should be used to determine how the rule should be applied.
- The **Internal/External Indicator** must equal that on the account record in the DW. It indicates whether the rule applies to the internal data (value of “I”), or external financial data (value of “E”).
- The **Fiscal Year** on the rule must match the Fiscal Year on the account record.
- The **Record Type** must be equivalent to that of the account record. Values include FO (encumbrance), FT (account detail), FS (subsidiary ledger) and FG (general ledger).
- The **Transaction Type** must be equal to that in the FT account record, if the rule applies to the FT Record Type above.
- If the rule applies to an FT record, then the record’s **CPU date** must be greater than or equal to the **Effective Start Date** and less than or equal to the **Effective End Date**.
- The **Corporation** specified in the rule must equal/not equal (depending on the **Corporation Operand**) that of the FG or FS element determined by the Record Type above.
- The **CorporationFund** specified in the rule must equal/not equal (depending on the **CorporationFund Operand**) that of the FG or FS element determined by the Record Type above.
- The **Fund** specified in the rule must equal/not equal (depending on the **Fund Operand**) that of the FG or FS element determined by the Record Type above, or the **Fund Mask 1** must be equal/not equal (depending on the **Fund Mask 1 Operand**). (See “masking” rule in **Attachment III**.)
- The **Department** specified in the rule must equal/not equal (depending on the **Department Operand**) that of the FG or FS element determined by the Record Type above, or the **Department Mask 1, 2 or 3** must be equal/not equal (depending on the **Department Mask 1, 2 or 3 Operand respectively**). (See “masking” rule in **Attachment III**.)
- The **Account Number** specified in the rule must be equal/not equal/greater than/greater than or equal to, less than, or less than or equal to (depending on the **Account Number Operand**) that of the FG, FS or FT element determined by the Record Type above, or the **Account Number Mask 1, 2, 3, 4, 5, 6 or 7** must be equal/not equal/greater than/greater than or equal to, less than, or less than or equal to (depending on the **Account Number Mask 1, 2, 3, 4, 5 or 6 Operand**). (See “masking” rule in **Attachment III**.)
- The **Subcode** specified in the rule must be equal/not equal/greater than/greater than or equal to, less than, or less than or equal to (depending on the **Subcode Operand**) that of the FG, FS or FT element determined by the Record Type above, or the **Subcode Mask 1, 2, 3, or 4** must be equal/not equal/greater than/greater than or equal to, less than, or less than or equal to (depending on the **Subcode Mask 1, 2, 3, or 4 Operand**). (See “masking” rule in **Attachment III**.)
- The **Map Code** specified in the rule must equal/not equal (depending on the **Map Code Operand**) that of the FS element determined by the Record Type above.
- The **PCS Primary Code** specified in the rule must equal/not equal (depending on the **PCS Primary Code Operand**) that of the FG or FS element determined by the Record Type above and the **Fiscal Year Flag**, or the **GL PCS Mask 1 or SL PCS Mask 1** specified in the rule must equal/not equal (depending on the **GL PCS Mask 1 or SL PCS Mask 1 Operand**) that of the FG or FS element determined by the Record Type above and the **Fiscal Year Flag**. (See **Attachment III** for details.)
- The **Report Class** specified in the rule must equal/not equal (depending on the **Report Class Operand**) that of the FG or FS element determined by the Record Type above, or the **Report Class Mask 1** must equal/not equal (depending on the **Report Class Mask 1 Operand**). (See “masking” rule in **Attachment III**.)

- The **Revenue Purpose** specified in the rule must equal/not equal/greater than/greater than or equal to, less than, or less than or equal to (depending on the **Revenue Purpose Operand**) that of the FS element determined by the Record Type above.
- The **Expense Purpose** specified in the rule must equal/not equal/greater than/greater than or equal to, less than, or less than or equal to (depending on the **Expense Purpose Operand**) that of the FS element determined by the Record Type above.
- The **Net Asset Class** specified in the rule must equal/not equal (depending on the **Net Asset Class Operand**) that of the FG element determined by the Record Type above.
- The **Capital Asset Account Flag** specified in the rule must equal/not equal (depending on the **Capital Asset Account Flag Operand**) that of the FG or FS element determined by the Record Type above.
- The **Loan Type** specified in the rule must equal/not equal (depending on the **Loan Type Operand**) that of the FG element determined by the Record Type above.
- The **RCTF Indicator** specified in the rule must equal/not equal (depending on the **RCTF Indicator Operand**) that of the FG element determined by the Record Type above.
- The **SL Sponsor Code** specified in the rule must equal/not equal/greater than/greater than or equal to, less than, or less than or equal to (depending on the **SL Sponsor Code Operand**) that of the FS element determined by the Record Type above.
- The **Current CIP Flag** specified in the rule must equal/not equal (depending on the **Current CIP Flag Operand**) that of the FG or FS element determined by the Record Type above.
- The **Transaction Entry Code** specified in the rule must equal/not equal (depending on the **Transaction Entry Code Operand**) that of the FT element determined by the Record Type above, or the **Transaction Entry Code Mask 1** must equal/not equal (depending on the **Transaction Entry Code Mask 1 Operand**).
- The **Transaction Charge Account Number** specified in the rule must equal/not equal/greater than/greater than or equal to, less than, or less than or equal to (depending on the **Transaction Charge Account Number Operand**) that of the FT element determined by the Record Type above, or the **Transaction Charge Account Number Mask 1** must equal/not equal/greater than/greater than or equal to, less than, or less than or equal to (depending on the **Transaction Charge Account Number Mask 1 Operand**).
- The **Transaction Charge Account Subcode** specified in the rule must equal/not equal/greater than/greater than or equal to, less than, or less than or equal to (depending on the **Transaction Charge Account Subcode Operand**) that of the FT element determined by the Record Type above.
- The **Transaction Charge Date** specified in the rule must equal/not equal/greater than/greater than or equal to, less than, or less than or equal to (depending on the **Transaction Charge Date Operand**) that of the FT element determined by the Record Type above.
- The **Transaction Credit Account Subcode** specified in the rule must equal/not equal/greater than/greater than or equal to, less than, or less than or equal to (depending on the **Transaction Credit Account Subcode Operand**) that of the FT element determined by the Record Type above.
- The **External Transaction Adjustment Code** specified in the rule must equal/not equal (depending on the **External Transaction Adjustment Code Operand**) the **Adjustment Code** on the External Transaction as specified by an **Internal/External Indicator** value of “E”.
- The **Amount Field Indicator** specified in the rule determines which FG, FS or FT amount element should be further evaluated by this rule.
- If the **Replace Flag** is “R”, then there are no further elements to be verified for application of the business rule. However, if the Replace Flag is “I”, then the **Amount Operand, Amount Value and Amount Multiplier** elements noted below must be examined. If the **Replace Flag** is “F” or “L”, then the **Amount Multiplier** elements noted below must be examined.
- If the **Amount Operand** is “EQ”, then the amount in the element identified above must be equal to the value in **Amount Value** for the rule to apply. If the **Amount Operand** is “NE”, then the amount in the element identified above must be not equal to the value in **Amount Value** for the rule to apply. If the **Amount Operand** is “LT”, then the amount in the element identified above must be less than the value in **Amount Value** for the rule to apply. If the **Amount Operand** is “GT”, then the amount in the element identified above must be greater than the value in **Amount Value** for the rule to apply. If the **Amount**

Operand is “LE”, then the amount in the element identified above must be less than or equal to the value in **Amount Value** for the rule to apply. If the **Amount Operand** is “GE”, then the amount in the element identified above must be greater than or equal to the value in **Amount Value** for the rule to apply.

- If the amount determined by the above should be multiplied by the value in the **Amount Multiplier** to determine its impact on the financial statement cell identified within the business rule.

REQ-4.3.3.3 (Reload of External Financial Account Records):

A job needs to be created to update the external financial data, upon request from the Controller’s Division. This job should delete the existing external data, and then load the new using the application of the logic noted above.

REQ-4.3.3.4 (Process for Update of Business Rules):

As noted in 4.3.2 above, the Controller’s Division is responsible for maintaining the business rules in a spreadsheet. When changes have been made to the business rules, a job will need to be run to delete the existing business rule data within the Data Warehouse, and upload the revised data to the Data Warehouse. In addition, a job needs to be developed to “blow away” the existing data in the Data Warehouse containing the “tags” or cross-reference of the account detail and summary records with the business rule(s) to which they were originally assigned. After this has been completed, then all of the account detail and summary records for that Fiscal Year need to be reassigned or tagged to the financial statement cells based on the revised Business Rule data. Normally, this process would take place on a monthly basis, but could be scheduled more frequently.

4.3.4 Sign-Off on Section 4.3 – GASB Logic for Loading Internal and External Data, and for the Financial Statement Business Rule Application

By signing below, you certify that you have read, fully understand, and agree with the contents section **4.3 – GASB Logic for Loading Internal and External Data, and for the Financial Statement Business Rule Application** of this document, and any Attachments referenced within. Changes made to the requirements after this date must be agreed upon in writing, and will affect the project timeline.

| <i>Printed Name/Title</i> | <i>Signature</i> | <i>Date</i> |
|---------------------------|------------------|-------------|
| _____ | _____ | _____ |
| _____ | _____ | _____ |
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4.4 GASB Data Warehouse Financial Statement Production

4.4.1 Description and Priority

An automated means of producing both monthly and yearly financial statements for the University needs to be developed by Information Technology. The Controller's Division would like to be able to produce both a print and electronic versions of the statements. In addition, they would like a detailed "audit trail" of the account records "tagged" to the cells on the financial statements at the time they are produced. (They should be able to report on both the summary (FG or FS) and detail (FT) records which were included in the calculations of that specific statement.) They would like this audit trail physically stored in the Data Warehouse, so they can run reconciliation reports to help resolve any problems with the financial statements or the business rules used to compile them. This audit trail could be "overwritten" the next time the financial statement is produced. However, they would like the audit trail from the financial statements to be part of the month-end and year-end storage and archival process. This section of the requirements document will explain the logic and process for creation of these financial statements and the associated audit trail.

4.4.2 Action/Response Sequences

Users in the Controller's Division will schedule the jobs to produce the monthly and yearly financial statements, and the associated audit trail data. **Parameters** supplied by these users should: determine which **Month and/or Fiscal Year** they need the statement to cover, indicate the current year (to be used in the calculation of the prior year), indicate which output options (print and/or electronic) are requested, indicate which statement(s) (**Form ID**) should be produced, indicate the date which should appear in the statement heading. They will also write any additional reports required to analyze the detail behind the summary information in the financial statements.

4.4.3 Functional Requirements

REQ-4.4.3.1 (Logic):

The following financial statements will need to be produced. The **Form ID Prefix** below is that used in the **first three characters** of the Form ID field on the business rule and financial statement text records defined in 4.1.3.4. (**NOTE: These three statements need to be produced in one electronic file/spreadsheet for each of the "entities" noted below.**)

- Statement of Net Assets - Form ID Prefix: equal "**NAS**".
- Statement of Revenues, Expenses and Changes in Net Assets - Form ID Prefix: equal "**SRE**".
- Statement of Cash Flows - Form ID Prefix: equal "**CFL**".

The above three statements will need to be produced for the various organizations noted below. The **Form ID Suffix** below is that used in the **last seven characters** of the Form ID field on the business rule and financial statement text records defined in 4.1.3.4.

- University of Kentucky Consolidated Financial Report - All corporations less than 98 and all fund groups except 35 plus KHE, KTI and HCCS (external data). Form ID Suffix equal "**UKCONS**".
- University of Kentucky - Corp 01 plus KHE (external data). Form ID Suffix equal "**UKKHE**".
- University of Kentucky Research Foundation - Corp 02 plus KTI (external data). Form ID Suffix equal "**UKRFKTI**".

- The Fund for Advancement of Education and Research in the University of Kentucky Medical Center - Corp 03. Form ID Suffix equal **“FUND ”**.
- University of Kentucky Athletic Association - Corp 05. Form ID Suffix equal **“UKAA ”**.
- University of Kentucky Business Partnership Foundation, Inc - Corp 08. Form ID Suffix equal **“UKBPF”**.
- University of Kentucky Equine Research Foundation, Inc. - Corp 04. Form ID Suffix equal **“UKERF ”**.
- University of Kentucky Humanities Foundation, Inc. - Corp 06. Form ID Suffix equal **“UKHF ”**.
- University of Kentucky Mining Engineering Foundation, Inc. - Corp 07. Form ID Suffix equal **“UKME”**.
- University of Kentucky Center on Aging, Inc. - Corp 09. Form ID Suffix equal **“UKCOA”**.
- University of Kentucky Health Care Collection Service, Inc. - External data, Corp 10. Form ID Suffix equal **“UKHCCS ”**.
- University of Kentucky Housing and Dining System - Corp 01, fund group 40 and corporation 01 fund groups 31, 32, 33, and 34 when first 3 digits of dept # equal ‘3HA’ for 2001-2002; (837 for FY 2000-2001). Form ID Suffix equal **“UKHD”**.
- University of Kentucky Tobacco and Health Research Institute - Corp 01, fund group 13. Form ID Suffix equal **“THRI”**.
- University of Kentucky Lexington Community College - Corp 01, college equal 8y or dept # equal 9905y. Form ID Suffix equal **“LCC ”**.

NOTE: The following financial statements will NOT be handled as part of this project:

- University of Kentucky WUKY Financial Report*
- University of Kentucky Albert B. Chandler Medical Center University Hospital*
- University of Kentucky Intercollegiate Athletics Program (NCAA Audit)*
- Comprehensive Annual Financial Report Commonwealth of Kentucky*
- Annual Fund Accounting Statement

NOTE: The following “Un-audited required reports” will NOT be handled as part of this project:

- FD reports
- Executive Budget
- IPEDS

- IRS 990's

NOTE: In addition to the Form IDs specified above, we will also use a “dummy” **Form ID of “NOTAG”** to identify any FRS transactions that should not be reflected on any financial statement. The Controller’s Division will create the necessary business rule(s) to identify these transactions, and the program that “tags” the accounting records with their respective business rules should work as any other time. In a similar fashion, a **Form ID of “TRANELIM”** will be used to tag any records for transfers or eliminations.

REQ-4.4.3.2 (Financial Statement Logic):

For years following 01-02, each statement will have four columns: Current Year (Un-Rounded), Current Year (Rounded), Prior Year (Rounded) and the Difference (Rounded) between the two years. Since 02-03 is the first year we are using GASB standards, this year’s financial statements will only contain the Current Year Un-Rounded and Rounded data. **Current Year** figures will be calculated based on the Current Year specified in the parameters. The **Prior Year** column on the financial statements will need to be calculated based on the data in the “Current Year” (rounded) amounts on the financial statement on the prior year’s Year-End snapshot, plus making any adjustments indicated in the external data (Adjustment Code of “P”) for the current fiscal year. It will be possible for more than one adjustment record for a prior year cell on the financial statements. The **Difference** figures will be the Current Year amounts less the Prior Year amounts.

NOTE: Because adjustments to the Current Year will initially be made to the financial statements via an external transaction, the “expired” external transactions will need to be deleted from the spreadsheet, and subsequently the Data Warehouse, after the corrections are made in FRS. The Controller’s staff will be responsible for ensuring such corrections are made to the data.

An example of the Statement of Net Assets is included in **Attachment IV**. An example of the Statement of Revenues, Expenses and Changes in Net Asset is included in **Attachment V**. The example of the Statement of Cash Flows is included in **Attachment VI**.

NOTE: Examples of the “mapping” logic between the cells on the financial statements and the FRS elements are contained in each of the above three Attachments. The business rules created by the Controller’s Division should cover all of the mapping logic provided in these Attachments, and in subsequent mapping documents on all the organizational variations of these three statements.

There will be variations in both the text for the statement column and row headings, as well as in the logic for the calculation of the amounts on the cells on each statement, depending on which statement is being produced and for which organizational entity. The Controller’s staff will maintain a spreadsheet containing the appropriate text for each line on each statement based on the Fiscal Year, Form ID, Second Report Level, Third Report Level, Fourth Report Level, Fifth Report Level and Sixth Report Level. A job needs to be written to upload the file produced from this spreadsheet into the Data Warehouse. This file will be used to produce the financial statements. An example of the Financial Statement Text Table is included in **Attachment VII – Sample Financial Statement Text Table**.

The logic for producing these statements includes:

1. copying the “pre-summary” account records to the “audit trail” portion of the Data Warehouse, in order to document the production of the financial statements,
2. determining which financial statement cell the business rule applies to by the combination of **Form ID, Second Report Level, Third Report Level, Fourth Report Level, Fifth Report Level and Sixth Report Level** on the business rule,
3. evaluating the impact (mathematical value) of the business rule on the specified cell based on the logic specified in the business rule,
4. **summarizing** all the account record amounts by the **business rule(s)** to which they are “tagged” (using the amount element specified within that business rule), and creating the corresponding audit records,

5. **summarizing** the above amounts **by the cell on the financial statement or determining** which value is the “**replacement**” value or “**linked value**” where appropriate, and creating the corresponding audit records,
6. using the translations of the cells identifiers/codes (**Form ID, Second Report Level, Third Report Level, Fourth Report Level, Fifth Report Level and Sixth Report Level**) to the physical format and text descriptors identified in **Attachment VII** to produce the statement, and
7. doing any mathematical calculations between the cells based on the signs indicated in the values in the examples in **Attachment IV – VI**. (Values within parentheses or preceded by a negative sign should be subtracted from the preceding totals as indicated. Values without a sign should be considered positive, and added to preceding values where shown in the examples.)
8. ensure any necessary rounding is done before the final production of the statements. The “consolidated” (UKCONS) versions of all three financial statements (NAS, REC and CFL) are in measures of 1,000 dollars, while the other financial statements are in whole dollars. **OCT will do any further adjustments for rounding errors by creating an external transaction with an Adjustment Code or “R”, and rerunning the statements.**

REQ-4.4.3.2 (Output Format):

The Controller’s Division would like to be able to produce both a print and **electronic versions** of the statements. The print output should look like that provided in the examples in **Attachment IV – VI**. **The electronic version should include an electronic copy of the print output, a comma delimited file of the output (to subsequently upload into EXCEL), and a HTML version of the output.** If the programming tool used to produce the statements permits, the users would like direct output to an EXCEL format, rather than the comma-delimited file format. Output from these statements should be sent by the email ID ‘**dbadmin@email.uky.edu**’ to the following public folder in Microsoft Outlook: ‘**OCT/GASBReports/GASBStatements**’. The Controller’s Division will be responsible for doing any formatting of the data in EXCEL.

In addition, the Controller’s Division would like a detailed “audit trail” of the account records “tagged” to the cells on the financial statements at the time they are produced. They would like this audit trail physically stored in the Data Warehouse, so they can run reconciliation reports to help resolve any problems with the financial statements or the business rules used to compile them. This audit trail could be “overwritten” the next time the financial statement is produced. However, they would like the audit trail from the financial statements to be part of the month-end and year-end storage and archival process.

4.4.4 Sign-Off on Section 4.4 – GASB Data Warehouse Financial Statement Production

By signing below, you certify that you have read, fully understand, and agree with the contents section **4.4 – GASB Data Warehouse Financial Statement Production** of this document, and any Attachments referenced within. Changes made to the requirements after this date must be agreed upon in writing, and will affect the project timeline.

Printed Name/Title

Signature

Date

Printed Name/Title

Signature

Date

Printed Name/Title

Signature

Date

Printed Name/Title

Signature

Date

4.5 GASB Data Warehouse Data Quality Assurance

4.5.1 Description and Priority

An automated means of assuring data quality and integrity needs to be established during the loading of the data into the Data Warehouse. This section of the requirements document will identify the elements that need to be verified, the logic for the verification, and process for dealing with data quality issues.

4.5.2 Action/Response Sequences

The Information Technology staff will program data quality assessment, and these will be run prior to, during or following the loading of the data into the Data Warehouse. The Controller's Division is responsible for defining all minimum standards for data quality (elements, rules, process), and for resolving any data quality issues. Output from all of these data quality reports should be sent by the email ID 'dbadmin@email.uky.edu' to the following public folder in Microsoft Outlook: 'OCT/GASBReports/GASBDataQuality'.

4.5.3 Functional Requirements

REQ-4.5.3.1 (Data Quality Assessment Rules and Process):

The following data standards should be followed **during the load of data into the Data Warehouse**.

1. All fiscal year fields should be expanded to include a four-digit year (01-02 would be 20012002).
2. All other date fields should be of the format CCYYMMDD.
3. All values should be consistent with those specified within the valid value range in IDMS, plus any additional values specified in the attachments.
4. PCS codes and the corresponding percentage and amounts, should be broken apart on separate records.

The Controller's Division feels adequate assessment of data quality is currently done within FRS as part of the normal month-end processing. Chris Donahoe, Dale Austin and Jennifer Miles run various reports to validate the data in FRS prior to the month-end closing. However, to ensure accuracy of the data within the Data Warehouse that is updated on a nightly basis, jobs will need to be run prior to the loading of any external financial data and each day after the internal (FRS) data is loaded into the Data Warehouse. **If any of the rules below are violated, the appropriate error reports should be generated. so the Controller's Division can fix the data in the external financial transaction spreadsheet or FRS within 24 hours (work day) of its initial reporting.**

NOTE: All data quality issues below must be resolved before any month-end or year-end snapshot can be taken.

Check for the missing data specified below, and produce corresponding error reports after the data is loaded into the Data Warehouse. **NOTE: All data quality reports should be driven from a parameter for the Fiscal Year.**

5. **External/Internal Indicator** should be on all records extracted from IDMS (value "I"), and those uploaded from the file containing the external financial transactions (value "E").
6. All subsidiary ledger (FS) account records except for ledgers 1, 6 and 9 must contain at least one PCS code. (See **Attachment II** for FRS element identification.) Unless the account was not valid in the prior year, the record should also contain at least one PCS code for the prior year. Correspondingly, the record should contain a future year PCS code unless the record is not valid in the future year.
7. All PCS codes on the subsidiary ledger (FS) account records noted above must have a corresponding percentage amount. (See **Attachment II** for FRS element identification.)

8. **FG040** – Account Title (Short) – X(20),
9. **FG042** – Responsible Person – X(20),
10. **FG044** – Address – X(20),
11. **FG046** – Year End Process – X(1),
12. **FG144** – Department – X(5),
13. **FG148** – Fund Group – X(2),
14. **FG14B** – Corporate Entity - X(2),
15. **FG501** – Long Description – X(40),
16. **FG820** – Bank (Depository) – X(2),
17. **FG822** – Bank (Disbursement) - X(2),
18. **FG824** – Speed Sort – X(4),
19. **FG834** – Include in LSDS - X(1),
20. **FG862** and **FG148 equal 31**– Plant Fund Area - X(1),
21. **FG872** and **FG148 equal 79**– Loan Type - X(1),
22. **FG894** – GL Net Asset Class – X(2),
23. **FG895** – Report Class - 9(2),
24. **FG896** – GL Cash Flow Class – X(1),
25. **FG897** – GL SRE Class – X(1),
26. **FG898 equal “ “ and FG894 equal “RE”** – GL PCS Code – X(3),
27. **FG898 equal “ “ and FG894 equal “RN”** – GL PCS Code – X(3),
28. **FS036** – ABR Flag - X(1),
29. **FS039** – Map Code - X(5),
30. **FS040** – Account Title (Short) - X(20),
31. **FS042** – Responsible Person - X(20),
32. **FS052** – Department - X(5)
33. **FS058** – Year End Processing - X(1)
34. **FS060** – Address - X(20),
35. **FS062 equal “ “ and FS066 equal “40”** – Revenue Line – X(4),
36. **FS064 equal “ “ and FS066 equal “41”** – Expense Line – X(4),
37. **FS066** – Fund Group - X(2),
38. **FS06B** – Corporate Entity - X(2),
39. **FS140** – Account Title (Long) - X(80),
40. **FS722** – Speed Sort Code - X(4),
41. **FS728** – Bank (Depository) - X(2),
42. **FS730** – Bank (Disbursement) - X(2),
43. **FS731** – SL Report Class – X(2),
44. **FS733** – SL Cash Flow Class – X(1),
45. **FS735** – SL SRE Class – X(1),
46. **FS736 equal “ “ and FS066 equal 31**– Plant Fund Area - X(1),
47. **FS738 equal “ “ and FS066 equal 31**– Plant Fund Account Type – X(1),
48. **FS748 equal “ “ and FS066 equal 31**– Plant Fund Division – X(1),
49. **FS764 equal “ “ and FS066 equal 31**– Source Code - X(1),
50. **FS84M** – Primary PCS #1 – X(3).

Other edits enforced at ***times indicated below.***

51. The sum of all PCS code percentages on the subsidiary ledger (FS) records should always equal 100%. (See **Attachment II** for element identification.) This report will be run daily after the FRS extracts are loaded into the Data Warehouse.
52. Each business rule should have a unique sequential number. **If more than one rule as the same sequential number, then the business rules should not be loaded until this problem is resolved.**
53. There should only be one business rule with a value of “R” in the **Replace Flag** active for a cell on a financial statement. If more than one is active for a given period of time, all should be listed on an error report. **This report should be run prior to loading the business rules into the Data Warehouse. The business rules should not be loaded until this problem is resolved.**

- 54.** The **Amount Field Indicator** should be consistent with the **Record Type** on the transactions. For example, the Amount Field Indicator should identify FS amount elements if the Record Type is "FS". **This report should be run prior to loading the business rules into the Data Warehouse. The business rules should not be loaded until this problem is resolved.**
- 55.** If a business rule has an "R" in the **Replace Flag**, then the **Amount Operand** should be blank. If the rule has an "I" in the **Replace Flag**, then the **Amount Operand** cannot be blank. **The business rules should not be loaded until this problem is resolved.** If the **Replace Flag** is "F", then the **Complex Logic Formula** element cannot be blank. If the **Replace Flag** is "L", then the **Reference – Form ID** and the **Reference – Second Report Level** cannot be blank.

56. GLDELCD - If FG026 NE '0' AND FG914 EQ '1100' AND FG946 NE 0, then print FG008"-FG914, FG040, and FG946 with the headings "ACCT", "TITLE" and "YTD ACTUAL" respectively, and the title "(GLDELCD VALIDATE)" and run date.

57. GLFLAGCD – If FG026 EQ '0' AND
 ((FG008 GE '010001' AND FG008 LE '010999' AND FG046 NE 'F') OR
 (FG008 GE '011000' AND FG008 LE '011499' AND FG046 NE 'P') OR
 (FG008 GE '011605' AND FG008 LE '011699' AND FG046 NE 'P') OR
 (FG008 GE '012001' AND FG008 LE '012799' AND FG046 NE 'F') OR
 (FG008 GE '012800' AND FG008 LE '012999' AND FG046 NE 'P') OR
 (FG008 GE '013000' AND FG008 LE '018999' AND FG046 NE 'F') OR
 (FG008 GE '020001' AND FG008 LE '029999' AND FG046 NE 'P' AND
 FG046 NE 'Y') OR
 (FG008 GE '060001' AND FG008 LE '069999' AND FG046 NE 'P' AND
 FG046 NE 'Y') OR
 (FG008 GE '030001' AND FG008 LE '039999' AND FG046 NE 'F') OR
 (FG008 GE '050001' AND FG008 LE '059999' AND FG046 NE 'Y') OR
 (FG008 GE '090001' AND FG008 LE '099998' AND FG046 NE 'F'))
 then print FG008, FG040, FG046 and FG026 with the headings "ACCT#", "SHORT TITLE", "PROC
 FLAG" and "DFLAG" respectively and the title "GENERAL LEDGER YEAR END PROCESSING
 FLAGS", "(GLFLAGCD VALIDATE)" and run date.

58. GLFUNDCD – If FG026 EQ '0' AND
 ((FG008 GE '010000' AND FG008 LE '010999' AND FG148 NE '01') OR
 (FG008 GE '011500' AND FG008 LE '011599' AND FG148 NE '01') OR
 (FG008 GE '012001' AND FG008 LE '012699' AND FG148 NE '01') OR
 (FG008 GE '016000' AND FG008 LE '016999' AND FG148 NE '01') OR
 (FG008 GE '018900' AND FG008 LE '018999' AND FG148 NE '01') OR
 (FG008 GE '012700' AND FG008 LE '012799' AND FG147 NE '6') OR
 (FG008 GE '014000' AND FG008 LE '014999' AND FG148 NE '41') OR
 (FG008 GE '018000' AND FG008 LE '018899' AND FG148 NE '41') OR
 (FG008 GE '015000' AND FG008 LE '015999' AND FG148 NE '40') OR
 (FG008 GE '017000' AND FG008 LE '017999' AND FG148 NE '02') OR
 (FG008 GE '019000' AND FG008 LE '019999' AND FG148 NE '80') OR
 (FG008 GE '013000' AND FG008 LE '013999' AND
 FG148 NE '01' AND '11' AND '12' AND '80' AND FG147 NE '5') OR
 (FG008 GE '011000' AND FG008 LE '011499' AND FG147 NE '2') OR
 (FG008 GE '011600' AND FG008 LE '011992' AND FG147 NE '2') OR
 (FG008 GE '020000' AND FG008 LE '029999' AND FG148 NE '12') OR
 (FG008 GE '060000' AND FG008 LE '069999' AND FG148 NE '12') OR
 (FG008 GE '030000' AND FG008 LE '039999' AND FG147 NE '1') OR
 (FG008 GE '040000' AND FG008 LE '040105' AND FG148 NE '79') OR
 (FG008 GE '040109' AND FG008 LE '040115' AND FG148 NE '79') OR
 (FG008 GE '040117' AND FG008 LE '049999' AND FG148 NE '79') OR

(FG008 GE '050000' AND FG008 LE '052999' AND FG148 NE '70') OR
(FG008 GE '053000' AND FG008 LE '055999' AND FG148 NE '71') OR
(FG008 GE '058000' AND FG008 LE '059999' AND FG148 NE '71') OR
(FG008 GE '056000' AND FG008 LE '056999' AND FG148 NE '72') OR
(FG008 GE '057000' AND FG008 LE '057999' AND FG148 NE '73') OR
(FG008 GE '070000' AND FG008 LE '074999' AND FG148 NE '31') OR
(FG008 GE '075000' AND FG008 LE '075999' AND FG148 NE '32') OR
(FG008 GE '076000' AND FG008 LE '076899' AND FG148 NE '33') OR
(FG008 GE '076900' AND FG008 LE '076999' AND FG148 NE '35') OR
(FG008 GE '077000' AND FG008 LE '077999' AND FG148 NE '34') OR
(FG008 GE '090000' AND FG008 LE '099995' AND FG147 NE '5'))

then print FG008, FG040, FG148, and FG026 with the headings “ACCT”, “SHORT TITLE”, “PROC FLAG” and “DFLAG” respectively, and the title “GENERAL LEDGER FUND GROUP”, “(GLFUND CD VALIDATE)” and run date.

59. GLNACD – If FG026 EQ '0' AND FG14B LT '98' AND

((FG148 EQ '70' AND FG894 NE 'RN') OR
(FG148 EQ '34' AND FG894 NE 'CP') OR
(FG147 EQ '0' AND '4' AND FG148 EQ '80' AND FG894 NE 'CU') OR
(FG148 NE '70' AND FG894 EQ 'RN'))

then print FG008, FG040, FG148, FG894, and FG026, sorted by FG008 and FG148, and with the headings “ACCT”, “SHORT TITLE”, “FG”, “NET AST CL” and “DFLAG” respectively, and the title “GENERAL LEDGER NET ASSETS CLASS”, “(GLNACD VALIDATE)” and run date.

60. GLRCCD – If FG026 EQ '0' AND FG14B LT '98' AND

((FG895 NE 'CU' AND FG147 EQ '0' AND '4' AND FG148 EQ '80') OR
(FG895 NE 'CR' AND FG147 EQ '1' AND '2') OR
(FG895 EQ 'EN' AND FG148 GE '70' AND FG148 LE '73') OR
(FG895 NE 'LN' AND FG148 EQ '79') OR
(FG895 NE 'PF' AND FG147 EQ 'E' AND FG148 NE '35') OR
(FG895 NE 'XC' AND FG148 EQ '35'))

then print FG008, FG040, FG148, FG894, and FG026, sorted by FG008 and FG148, and with the headings “ACCT”, “SHORT TITLE”, “FG”, “NET AST CL” and “DFLAG” respectively, and the title “GENERAL LEDGER REPORT CLASS”, “(GLRCCD VALIDATE)” and run date.

61. HSPMAPCD – If FS026 EQ '0' AND

((FS736 NE '6' AND (FS039 = '74060' OR '74020' OR '73110')) OR
(FS736 EQ '6' AND (FS039 EQ '74070' OR '73020' OR '73100')))

then print FS039, FS008, FS040, FS736 and FS052, sorted by FG039 and FS736, and with the headings “MAP”, “ACCOUNT”, “TITLE”, and “AREA DEPT” respectively, and the title “(HSPMAPCD VALIDATE)” and run date.

62. LCCMAPCD – If FS026 EQ '0' AND

(FS006 EQ '1' OR '2' OR '3') AND FS06B EQ '01' AND FS066 NE '02'
AND FS710 EQ '8Y' AND FS039 NE '10154' AND '16115' then print FS06B, FS709, FS052,
FS052/FS039, FS008, FS026, and FS040, sorted by FG039 and FS736, and with the headings
“CORP”, “SECTOR”, “DEPT#”, “DEPARTMENT TITLE”, “MAPCODE”, “AC”, “DFLAG” and “ACCOUNT
TITLE” respectively, and the title “LCC ACCOUNTS WITH INCOMPATIBLE MAPCODE NUMBERS”,
“(LCCMAPCD VALIDATE)” and run date.

63. MAPCODCD – If (FS006 EQ '1' OR '2') AND (FS026 NE '1' OR '2') AND FS01A NE '28' AND

((FS06B EQ '02' AND FS709 NE '4' AND FS039 NE '10921') OR
(FS06B EQ '04' AND FS709 NE '8' AND FS039 NE '10701') OR
(FS06B EQ '05' AND FS709 NE '8' AND FS039 NE '10741') OR

(FS06B EQ '03' AND FS709 NE '7' AND (FS039 NE '10601' AND FS039 NE '10612')
then print FS06B, FS709, FS052, FS052/FS039, FS008, FS026, and FS040, sorted by FG039 and
FS736, and with the headings "CORP", "SECTOR", "DEPT#", "DEPARTMENT TITLE", "MAPCODE",
"AC", "DFLAG" and "ACCOUNT TITLE" respectively, and the title "AFFILIATED CORP ACCOUNTS
WITH INCOMPATIBLE CORPORATION/SECTOR/MAPCODE NUMBERS", "(MAPCODCD
VALIDATE)" and run date.

64. PCS100CD

Compute "NUM01" = #FS84P + #FS84W + #FS85E + #FS85M + #FS85U
Define LIT01 'NOT = 100%' when NUM01 NE 1.000
IF NUM01 is NE 100% AND
(FS008 GE 100001 AND FS008 LE 899999 AND
FS026 EQ '0' AND
FS006 NE '6' AND FS006 NE '7' AND FS006 NE '4' AND
FS01A NE '96' OR FS01A NE '97')
then print
FS008, FS040, FS052, FS84M, FS84P (limit field to 6), FS026, S84T, FS84W (limit field to 6),
FS85B,FS85E (limit field to 6), FS85J, FS85M (limit field to 6), FS85R, #FS85U (limit field to 6),
NUM01(limit field to 6), LIT01, sorted by FS052, and with the headings "ACCOUNT", "TITLE", "DEPT.",
"PCS #1", "PCS #2", "PCS #3", "PCS #4", "PCS #5", "TOTAL %", and the title "LISTING OF ALL
ACCOUNTS WHOSE PCS PERCENTAGES DO NOT TOTAL TO 100 PERCENT", "(PCS100CD
VALIDATE)" and run date.
Break and sub-total on FS709

65. SLCORPCD

IF FS01A NE '28' AND FS026 EQ '0' AND
((FS06B EQ '02' AND FS006 GT '5') OR
(FS06B EQ '03' AND (FS006 NE '1' AND FS006 NE '2' AND FS006 NE '3' AND FS006 NE '5')) OR
(FS06B EQ '05' AND FS006 NE '1' AND FS006 NE '2' AND FS006 NE '3' AND FS006 NE '5' AND
FS008 NE '714320' AND FS008 NE '719990') OR
((FS06B EQ '04' OR FS06B EQ '06' OR FS06B EQ '07' OR FS06B EQ '08' OR FS06B EQ '09') AND
FS006 NE '5') OR
((FS066 EQ '02' OR FS066 EQ '40' OR FS066 EQ '41' OR FS066 EQ '61' OR FS066 EQ '62' OR
FS066 EQ '80' OR FS066 EQ '13' OR FS066 EQ '14' OR FS065 EQ '2') AND FS06B NE '01'))
Then print FS06B, FS006/'-/FS010, FS040, FS042, FS026 with the headings "CORP #", "ACCOUNT
#", "ACCOUNT TITLE", "RESP PERSON", and "DFLA" respectively, and the title "ACCOUNTS WITH
INAPPROPRIATE CORPORATION NUMBERS", "(SLCORPCD VALIDATE)" and run date.

66. SLFLAGCD

IF FS01A NE '96' AND FS026 EQ '0' AND
((FS058 NE 'F' AND FS006 NE '4' AND '6' AND '7' AND
FS01A NE '35' AND '36') OR
(FS058 NE 'P' AND (FS01A EQ '35' OR '36')))
then print FS008, FS040, FS066, FS058, and FS026 sorted by FS006 and FS066 with the headings
"ACCT #", "SHORT TITLE", "FG PROC FLAG" and "DFLAG" respectively, and the heading
"SUBSIDIARY LEDGER YEAR END PROCESSING FLAGS", "(SLFLAGCD VALIDATE)" and run date.

67. SLFUND

IF FS01A NE '96' AND FS026 EQ '0' AND
(((FS006 = '1' OR FS006 EQ '2') AND FS066 NE '01') OR
(FS008 GE '314000' AND FS008 LE '314999' AND FS066 NE '41') OR
(FS008 GE '315000' AND FS008 LE '315299' AND FS066 NE '40') OR
(FS008 GE '315300' AND FS008 LE '316999' AND FS066 NE '01') OR
(FS008 GE '317000' AND FS008 LE '317999' AND FS066 NE '02') OR

(FS008 GE '318000' AND FS008 LE '349999' AND FS066 NE '01') OR
(FS008 GE '350000' AND FS008 LE '359999' AND FS065 NE '2') OR
(FS008 GE '360000' AND FS008 LE '379999' AND FS066 NE '01') OR
(FS008 GE '380000' AND FS008 LE '389999' AND FS066 NE '41') OR
(FS006 = '4' AND FS066 NE '12') OR
(FS006 = '5' AND FS065 NE '1') OR
(FS006 = '6' AND FS065 NE '6') OR
(FS008 GE '700000' AND FS008 LE '774999' AND FS066 NE '31') OR
(FS008 GE '775000' AND FS008 LE '799999' AND FS066 NE '32') OR
(FS006 = '8' AND FS066 NE '80') OR
(FS006 = '9' AND FS065 NE '5'))

Then print FS006, FS008, FS040, FS066, FS026 sorted by FS006 with the headings "LEDGER #", "ACCT #", "SHORT TITLE", "FUND" and "DFLAG" respectively, and the title "ACCOUNTS WITH INAPPROPRIATE FUND GROUPS" and "(SLFUND CD VALIDATE)" and run date.

68. SLRCCD

IF FS01A NE '96' AND FS026 EQ '0' AND
((FS731 NE 'CU' AND (FS065 EQ '0' AND '4' AND FS066 EQ '80')) OR
(FS731 NE 'CR' AND (FS065 EQ '1' AND '2')) OR
(FS731 NE 'EN' AND (FS066 GE '70' AND FS066 LE '73')) OR
(FS731 NE 'LN' AND FS066 EQ '79') OR
(FS731 NE 'PF' AND FS065 EQ '3') OR
(FS731 NE 'XC' AND (FS066 EQ '35' AND FS06B GE '98')))

then print FS008, FS040, FS066, FS731, and FS026 sorted by FS006 and FS066 with the headings "ACCT#", "SHORT TITLE", "FG REPT CLASS" and "DFLAG", and the heading "SUBSIDIARY LEDGER REPORT CLASS", "(SLRCCD VALIDATE)" and run date.

Miscellaneous Reports

There needs to be a report that identifies all the internal and external records assigned to the specific cells on the specific financial statements. The **parameters** for this job should allow the Controller's Division to indicate the **Fiscal Year, Form ID and Second through Sixth Report Levels** to be analyzed.

There needs to be a report that lists all of the external transactions valid during a specific period of time. The **parameters** for this job should allow the Controller's Division to indicate the **Fiscal Year and Effective Start and End Dates**.

There needs to be a report that lists all of the internal (FG and FS) and external financial data that is not "tagged" or "mapped" to a business rule applying to the same fiscal year. This report should exclude any records attached to the NOTAG and TRANELIM forms, and should be sorted by Corporation, Account Number and Object Code.

There needs to be a report that lists all of the internal (FG and FS) and external financial data that are not "tagged" or "mapped" to at least two Form IDs in the same fiscal year. This report should exclude any records attached to the NOTAG and TRANELIM forms, and should be sorted by Corporation, Account Number and Object Code.

4.5.4 Sign-Off on Section 4.5 – GASB Data Warehouse Data Quality Assurance

By signing below, you certify that you have read, fully understand, and agree with the contents section **4.5 – GASB Data Warehouse Data Quality Assurance** of this document, and any Attachments referenced within. Changes made to the requirements after this date must be agreed upon in writing, and will affect the project timeline.

Printed Name/Title

Signature

Date

Printed Name/Title

Signature

Date

Printed Name/Title

Signature

Date

Printed Name/Title

Signature

Date

5. Other Nonfunctional Requirements

6. Security

Security will be based on the user roles defined within the GASB Data Warehouse module:

- The **Controller's staff** will have two types of users:
 - those who need only view/reporting access to **all** data required for producing the financial statements, as well as viewing the statements themselves,
 - those who need view/reporting access to **all** data required for producing the financial statements, the ability to update the non-IDMS financial, business rules and financial statement text data (by scheduling the appropriate jobs), and the ability to run the financial statements.
- The **Budget Office staff** will need only view/reporting access to **all** data required for producing the financial statements, as well as viewing the statements themselves.
- The **Computing Technical staff** supporting this project will have full access (view and update) to **all** data required for producing the financial statements.
- The **general campus users** will also need access to view and report on all the accounting data used to produce the financial statements.

NOTE: The process for obtaining access to and security enforcement for the FRS/GASB data in Oracle, will be consistent with the existing process and procedures for the FRS data in FOCUS or Sybase.

7. Issues

8. Sign-Off on Sections 5, 6 and 7 (Other Nonfunctional Requirements, Security and Issues)

By signing below, you certify that you have read, fully understand, and agree with the contents sections **5, 6 and 7 (Other Nonfunctional Requirements, Security and Issues)** of this document, and any Attachments referenced within. Changes made to the requirements after this date must be agreed upon in writing, and will affect the project timeline.

Printed Name/Title

Signature

Date

Printed Name/Title

Signature

Date

Printed Name/Title

Signature

Date

Printed Name/Title

Signature

Date
