Capital Funding Forecast Database Features and Functions

Abbreviations

ADM	Average Daily Membership (student enrollment)
CIP	Capital Improvement Project or generally for the programs administered by the Facilities Section
DEED	Department of Education and Early Development
DR	Debt Reimbursement
FY	Fiscal Year (July 1 – June 30)
GSF	Gross Square Footage
IT	Information Technology
MM	Major Maintenance (project or grant fund)
OASIS	Online Alaska School Information System
OIT	Office of Information Technology, Alaska Department of Administration
REAA	Regional Educational Attendance Area (school district or grant fund)
SC	School Construction (project or grant fund)
UI	User Interface

Goals and Objectives

The goal of the project is to construct a system that uses or stores existing Facilities section data in combination with standard financial principles to provide a statewide estimate of anticipated capital funding needs for school facilities and an analysis of funding scenarios to meet that need over specified periods of time. Development of a SQL back-end and a modern graphical user interface (GUI) front-end.

Specifically, the system will:

- Allow DEED Facilities staff to enter and retrieve information.
- Have a portal for school district personnel to make or request specific data changes.
- Provide printable reports of capital need, funding scenarios.
- Have an interactive graphical interface for determining single and multiple year funding scenarios to meet projected need.

The database will need to interface with existing DEED Facilities Access databases or have a method of integrating changes on an as-needed or semi-monthly basis.

High-Level Functions

The key high-level functionality consists of adding data to, and asking questions of, the database. This can be summed up as the ability to Add, Edit, Delete, and Query facility building system data from school district “renewal and replacement schedules”. The other key high-level function is the creation of standard and custom reports, including an interactive graphical display of selected of scenario options. An Internet-based user portal for district personnel to update building system data. A website for the general public to review reports is desired but may not be required immediately.

Success Criteria

The key success factor is a simple, clean user interface. The second key success factor is the ability to perform extensive reporting, both canned standard reports and custom ad-hoc reports. Ideally, it will be possible to easily turn a custom report into a standard report that can be accessed by others. End user training is desirable; however a clean, intuitive user interface will help keep the training requirements to a minimum.

Key Features for Initial Release

1. The ability to report a forecasted capital renewal need, in dollars, for every school facility over 1000sf in the state based on an analysis of the age, lifespan, and cost of its systems.
2. The ability to aggregate that forecasted need into any desired range of years within a rolling 20-year forecast.
3. The ability to associate that need, by building, with a school district, an attendance area, district type, and district status.
4. The ability to associate that need, by system, with a school district, an attendance area, district type, or district status.
5. The ability to integrate elements of existing facility data for each facility to include facility number, ID, name, ownership, community, category, status, building type, space category, GSF, and year.
6. The ability to report forecasted student populations, by attendance area, by school, or by grade, based on a standard projection methodology using historical trends.
7. The ability to associate that student population forecast with the cost of additional facility space based on a construction cost index for each attendance area.
8. The ability to report forecasted needs by statutory project type (i.e., Major Maintenance and School Construction) by establishing appropriate 'rules' for aggregating forecasted costs from capital renewal and new space, by facility.
9. The ability to model the indexed funding program elements (e.g., debt reimbursement and REAA Fund) to accurately project statutory funding amounts.
10. The ability to report projected shortfalls in funding by comparing the forecasted need, by project type, by FY, with the indexed funding program elements.
11. The ability to associate this shortfall into any desired range of years.
12. The ability to input funding approval amounts, by specific dollar or by percentage of need, for any statutory fund (e.g., major maintenance, school construction, REAA, and debt reimbursement) and to generate funding scenarios through interrelated 'what if' calculations to meet forecasted capital needs, by FY.
13. The ability to influence the state portion of the forecasted need by adjusting local participating share percentages and debt reimbursement percentages.
14. The ability to influence funding analyses by including financial metrics such as inflation rates and costs of borrowing.

Desired Features

a. The ability to include additional granularity for each facility so that original construction and each addition are separately represented and then aggregated to the complete facility. Note: Current database records of school facilities with original and addition portions total approximately 1500.
b. The ability to validate the 'life-span' of a facility system by revising the remaining life up or down based on observed conditions, maintenance records, or other data. To be accomplished by a school district through web-based portal.
c. The ability to adjust the forecasted need for any system, in any facility, for a partial renewal if that system was not fully renewed under a particular capital project.
d. The ability to have each school district access the forecast by-building and by-system data for any desired range of years.
e. The ability to have more than one 'cost index' (e.g., insured replacement value, Cost Model construction cost, etc.)
f. The ability to have more than one student population projection methodology (i.e., Survival Ratio/Grade Progression in addition to straight-line annual percent change over 10 years.)
g. The ability to include local funding or federal funding that has been or will be applied to the forecasted need.

h. The ability to calculate, based on existing DEED metric, when it would be more cost-effective to replace a facility, based on accumulation of deferred maintenance or anticipated system renewal costs and anticipated construction costs of the DEED Cost Model.
i. The ability to calculate and report on the "number of jobs created or sustained" within any of the what-if funding scenarios.
j. Include data/information available on Bulk Fuel Facilities as part of the database.
k. Include data/information on space variances for use in the school space portion of the analysis.

Anticipated User Types (Persona) and Tasks

1. Database Owner/Administrator: This will be DEED Facilities personnel—a five-person team—and may combine with some DEED IT personnel. Full data access rights, including source code, to every database, table, report, query, etc. Ability to write and run new queries and reports.
2. School District Data QC: This will be a managed group of one or more credentialed persons from each district with rights to adjust specific fields related to facility system condition (i.e., lifespan) and partial renewal data.
3. Forecast Report Generation/Extraction: This will be available to a wide distribution of stakeholders including DEED personnel, school district personnel, OMB personnel, other department personnel, etc. on an 'approved request' basis. When fully vetted this could be made available to the public. Users would be able to select appropriate data element choices (e.g., by year, by district, etc.) to produce 'any' pre-built report regarding the forecasted need for school capital.
4. Funding Modeler: Initially this will be DEED Facilities personnel and DEED leadership. Eventually, this could include OMB and the Legislature. When fully vetted, it could be a publicly accessible interface. These persons would have access to the Dashboard for scenario development.

User Profiles Matrix

This table profiles different types of users, and their needs of the system. Please note that one employee may fill several roles, and therefore may be a member of more than one User Group. Also, the data access rights tend to apply to the functional area or usage of the application, rather than to restrict specific users.

User Group	Usage Frequency	Required Functionality	Data Access Rights
DEED Data Entry	Medium	Input, Canned and Custom Reports and Queries	Full
DEED DB Manager	Medium	Input, Canned and Custom Reports and Queries	Full
Data Browser	Medium	Canned Reports and Queries, and Web Access	Read Only
DEED Director	Light	Canned Reports and Queries, and Web Access	Read Only
Programmer/Analyst	Light	Input, Canned and Custom Reports and Queries, Database Maintenance, Development	Full, Source Code
School District Data Entry	Light	Input, Canned Reports and Queries, and Web Access	Limited
General Public	Medium	Web Access	Read Only

Describe the Dashboard

As initially envisioned, the interactive Dashboard would display the forecasted need (for a selected fiscal year or range of fiscal years) by project type (MM or SC). Next would be a display of the statutory funds (MM, SC, REAA) and the available grant fund balance and projected REAA grant appropriation calculation. The

Dashboard would then and offer a series of 'sliders' for the available and pertinent funding variables to meet the forecasted need. Those envisioned variables include:

- Debt Reimbursement Allocation (select/input a dollar amount or percentage of need)
- Major Maintenance Grant Fund Allocation (select/input a dollar amount or percentage of need)
- School Construction Grant Fund Allocation (select/input a dollar amount or percentage of need)
- REAA Fund (indexed by formula to Debt Reimbursement)
- Local Participating Share (grants) (select/input a percentage by statutory category)
- Debt Reimbursement Percentage (select/input a percentage, e.g., 50%)
- Inflation Rates—maybe both general and construction specific (select/input a percentage)
- Interest Rates—cost of borrowing (select/input a percentage)
- Local Funding Sources (select/input a dollar amount or percentage of need)
- Federal Fund Sources (select/input a dollar amount)

The display, or a display subform, should include the total state costs of the funding scenario, inclusive of grants, debt principal, and debt projected financing costs.

The Dashboard interface will allow for displayed graphical data to be printed, and include all variable fields and data tables.

Describe the Desired Reports

Database should allow for ad hoc reports created by DEED Facilities staff and well as standard reports with set parameters that can be run and view by all users. All of the collected data elements should be 'query-able and reportable' for data entry backcheck, trend analysis, etc. This functionality would be primarily for in-house quantity control and verification. The following reports would be part of the initial feature set of the database and forecasting process as outlined prior:

1. Forecasted capital renewal need, in dollars, for every school facility over 1000sf in the state based on an analysis of the age, lifespan, and cost of its systems. Multiple reports would be able to be generated based on particular data fields such as: district, year, fiscal year, system type, etc.
2. Forecasted student populations, by attendance area, by grade, based on a standard projection methodology using historical trends.
3. Forecasted needs by statutory project type (i.e., Major Maintenance and School Construction) by establishing appropriate 'rules' for aggregating forecasted costs from capital renewal and new space, by facility.
4. Projected shortfalls in funding by comparing the forecasted need, by project type, by FY, with the indexed funding program elements.
5. State costs to meet developed funding scenarios, inclusive of grants, debt principal, debt financing and interest costs, etc.

A reports interface will provide an entry point to all standard reports. It will provide a method for the user to select from the list of available reports. For the report selected, the interface will then provide fields to specify the appropriate selection and sort criteria for the report. The interface will allow each report generated to be pre-viewed on screen and printed or exported to Excel.

Data Sources to Be 'Migrated'

The Facilities Section self-manages an assortment of MS Access databases that are updated periodically and year-to-year. Data in all of the below listed databases are available to the project:

1. **District.mdb** - District name and number information district type (REAA, City, Borough).
    a. Purpose: Basic district information.
    b. Updated rarely, with incorporation of new districts.

2. **Facility.mdb** – Area of Attendance, Buildings, Bulk Fuel, Facility Identification, GSF, Variances
    a. Purpose: Used to maintain an accurate list of facilities and facility related information for each district.
    b. Updated regularly.
3. **Insur.mdb** – Insurance Values, Maintenance Expenditures, District Insurance
    a. Purpose: Maintain insurance data by fiscal year for each district. Used to establish a districtwide building valuation.
    b. Updated annually.
4. **Project.mdb** – Adjustments to project funding, Bond Funded Projects, Debt Funded Project Approval Status, Funding Identification, Funding Costs, Grants Funded Projects, HB2003 Debt Requests, Multiple Grant Funding, Multiple Adjustments, Other Funding, Other State Funding, Project Costs, Project Identification, Bond Adjustments, Facilities that have received funding, Projects that have received funding
    a. Purpose: Track, maintain, and store project funding and completion information. Has the complete record of state aid appropriated to schools used in developing the state's response to the Kasayulie lawsuit.
    b. Updated regularly.
5. **CIP – FYXXXX - Final.mdb** – *FINAL LIST* –
    a. Purpose: Final CIP list. This database is used to produce reports for publication of school district requests for capital funding.

The Facilities Section maintains a collection of Excel spreadsheets of data that will be needed by the database:

1. Enrollment by School, Grade
2. Eligible enrollment for space calculation purposes (by school, by elementary and secondary)
3. Renewal and Replacement Schedules (by building portion)

List of Data Elements

The following might be an 80% complete list of necessary data element:

Data element	Element description	Entered	Calculated
Capital Renewal Data			
Component #	Unique, identifying number for each of 23 systems	✓	
Component Name	Name of each system type	✓	
Life Expectancy	# of years for system life span	✓	
Percent Cost -1 Floor	% cost for each system if 1 story	✓	
Percent Cost – 2 Floor	% cost for each system if 2 story	✓	
No of Floors	# of stories by Facility	✓	
GSFAge	Age of each original and addition		✓
Insurance Value	(from insurance database)	✓	
Year Installed	Year each system was installed	✓	
Replacement Value	Replacement value of each system based on % cost and insurance value		✓
Fiscal Year	Fiscal year of forecast		✓

Data element	Element description	Entered	Calculated
Year of Work	Forecasted year of replacement for each system		✓
Facility Data			
FacilityNumber	Unique, identifying number: 2 digit district number - 4 digit school number - 2 digit facility (000000-00).	✓	
DistrictNumber	Link to Districts table.	✓	
Facility	Name of the facility	✓	
FacilityOwnership	State or District, City, Borough, Private, Leased, or Unknown	✓	
AttendanceArea	Identify attendance area of facility	✓	
Community	Identify physical location of facility	✓	
Facility Category	ms=main school facility; s=school related facility; f=bulk fuel; d=district; sp=school support facility; o=other; u=unknown	✓	
Facility Status	c=current facility in use; h=historical facility no longer in use; o=not in use, doesn't exist	✓	
Building Type	Identifies building type as: Permanent, Permanent Portable, or Temporary.	✓	
Space Category	Identifies portion of building construction as: Original, Addition, Demolition, Unknown, Variance C, Variance J, Variance E	✓	
GSF	Exterior dimensions of enclosed space for each space category	✓	
Year	Calendar year of substantial completion or demolition	✓	
Year Purchased	If facility was purchased, year of purchase	✓	
District Data			
DistrictNumber	2-digit district code	✓	
DistrictType	Borough or City or REAA or Multiple/Statewide	✓	
District	Name of school district	✓	
C/H	District status: Current or Historical	✓	
Enrollment Data			

Data element	Element description	Entered	Calculated
K-6 ADM [FYXX]	Historical ADM by FY; past 10 years	✓	
7-12 ADM [FYXX]	Historical ADM by FY; past 10 years	✓	
Avg % Change K-6	Year-to-year % change each FY; averaged for 10 yrs		✓
Avg % Change 7-12	Year-to-year % change each FY; averaged for 10 yrs		✓
K-6 ADM Projection [FYXX]	Projected ADM based on 10yr average, by FY to 7 years		✓
7-12 ADM Projection [FYXX]	Projected ADM based on 10yr average, by FY to 7 years		✓
Space Data			
Allowable Space Elem	Allowable space [4 AAC 31.020] for K-6		✓
Allowable Space Sec	Allowable space [4 AAC 31.020] for 7-12		✓
Allowable Space K-12	Allowable space [4 AAC 31.020] for K-12		✓
Allowable Space Mixed	Allowable space [4 AAC 31.020] for mixed grade		✓
Allowable Space Sec+6	Allowable space [4 AAC 31.020] for 6-12		✓
Existing Space	Existing GSF by Attendance Area		✓
Eligible Space	Allowable space less existing space by Attendance Area		✓
Cost Data			
Construction Escalation Index	From Cost Model Table 3	✓	
Geographic Cost Factor	From Cost Model Table 1	✓	
Construction Cost	From Cost Model publication	✓	
Funding Data			
Funding Source		✓	
Funding FY		✓	
Funding Amount		✓	
CIP Requests SC		✓	
CIP Requests MM		✓	

Expectations for User Access & Provisioning

It is anticipated that Facilities Section staff will have full access to the database and the data elements for all areas of the forecasting tool that currently align with the Section roles and responsibilities. The user interface associated with the forecasting scenario tool may, if needed, have some limited access or be managed by a department vendor. External users (see **Client Participants and Availability**) will, following a training protocol, need to be granted a protected access to portions of the data (school districts) or to the forecasting UI.

To ensure State of Alaska website and digital accessibility, any web content, online applications, or other technologies must comply with Web Content Accessibility Guidelines (WCAG) 2.1 Level AA (or higher), maintained and published by the World Wide Web Consortium (W3C), for any web content, online applications, or other technologies furnished to the State.

Integrations with Other Systems

Integration with several existing 'local' databases currently maintained by the Facilities Section will be needed. Those systems consist of MS Access databases or databases running on SQL Server. Integration may consist of functions such as make-table queries, and other data extraction and assimilation methods. Student population data is contained in the OASIS database maintained by DEED outside of the Facilities Section. Access to that data will need to be arranged following standard protocols; alternatively, data pertinent to existing procedures and MS Excel-based population projection tools is available in MS Excel spreadsheets.

Assumptions for Hosting

Options for hosting internally or externally. If not hosted on a state of Alaska system, provide anticipated annual hosting cost. However, anticipate hosting of the database and UI application to be on the state system. This would be Department/OIT owned and managed in the State of Alaska (SOA) Azure tenant within the SOA tenant. There may be a point in time where this is migrated to the cloud if determined by OIT to be in the best interest of the state.

Devices Used for System Access

This database tool is envisioned for use on typical desktop platforms. Data entry and analysis will occur in an office (VPN) setting. Mobile platforms such as tablets and phones will not be required for data harvesting, manipulation or analysis. There could be a point during future development where the External Data Entry user (i.e., school district personnel) could benefit from a more 'real-time' ability to update condition information using a mobile device while on-site or in the field at a facility, however, this is not essential for the initial development.

Offline, Online Access or Mix

The external-facing elements including the UI which will provide scenario development, and the UI which will provide for updating of certain data elements by external sources, are envisioned to accessed on-line. The remainder of the database is envisioned as an offline (or cloud) product running on protected servers at the department. It could be beneficial to have the scenario Dashboard UI available as an embedded UI available offline.

Security Requirements

DEED is a state government organization, all of the data is considered public record. Therefore, there are not any significant security requirements. There is concern over the data entry process that the data be entered and classified correctly. DEED desires that the data be read only where appropriate. Any user input interface must meet the state's security requirements.

Expectations for Training (Persons & Tools)

Training requirements for the use of this database are anticipated to be minimal. Nearly all the elements of data entry and data analysis come from established process and procedures within the Facilities section. We see three key needs for training and tools:

1. Internal Data Entry – written procedures with illustrations and or 'screen shots' on how/where to input annual non-calculated data.
2. External Data Entry – written procedures, with appropriate graphics, and video instructions for credentialled school district partners who will be updating facility condition information annually.

3. UI Manipulation - written procedures, with appropriate graphics, and video instructions for credentialled internal personnel and external partners who will be using the interface to run 'what-if' scenarios.

Client Participants and Availability

Department staff from three sections will be needed for the success of this project, Facilities, School Finance, IT, and Assessments. In addition, the department's executive leadership team will represent end users that could include the Office of Management & Budget and members of the Legislature:

1. Facilities: The five-member Facilities team is fully vested in the project and available to quickly confirm requirements, priorities, and design. The team includes personnel with experience in manipulating data in all areas required by this project with the exception of the final user interface. With the exception of enrollment data, the Facilities unit 'owns and manages' all other data elements.
2. School Finance: The department's School Finance team will assist with information regarding the cost of state participation for debt reimbursement and the REAA Fund calculation.
3. IT: The department's IT team is familiar with the project requirements and has deep experience in database design and project assistance. While unable to undertake the project in-house due to workload constraints, the IT team will be a key stakeholder in helping to establish needed security and data access protocols.
4. Assessments: The department's Data team will help examine all requests for non-facilities data—primarily enrollment. The team will also participate in furnishing sample data for development and testing environments.
5. Executive Leadership: The department's leadership team—especially those with fiscal policy responsibility—will help guide the 'what-if' analysis elements of the final forecasting process. DEED is a small, tight department with simple lines of authority. Leadership assistance in this project is assured.

Project Leadership & Responsibilities

This project will be internally managed by DEED. The project manager is the Facilities Section Manager who has been with the department for 17 years and has carried the vision for this project for the past four years of funding requests. While management of a database application project will be new territory, the Project Manager has strong project management experience and client/consultant relationships. Key elements of project management will be assigned to department IT staff where needed.

Business Level Data Flow Diagram

The data flow diagram illustrates how the Capital Forecast DB is anticipated to interact with external systems, along with its standard inputs and outputs.