

**Analyses of
GARVEE
Bonding Capacity
2016**

Analyses for the
California Transportation Commission
April 2016

State Treasurer John Chiang



Table of Contents

Executive Summary	i
I. Purpose of Analyses	1
II. The Series 2008A GARVEE Financing	1
III. Need for Sensitivity Analyses	2
IV. Information Sources	2
V. Summary of Alternative Assumptions	3
VI. Summary of Results	4
VII. California Transportation Commission Policy	5
VIII. Recent Events	5
IX. Conclusion	6
<i>Attachment A:</i> Federal Deposits into the State Highway Account	
<i>Attachment B:</i> Detailed Assumptions for Sensitivity Analyses	
<i>Attachment C:</i> Detailed Worksheet for Sensitivity Analyses	
<i>Attachment D:</i> Detailed Summary Tables for Sensitivity Analyses	

Executive Summary

These analyses are provided to the California Transportation Commission (“Commission”) to assist in its compliance with the provisions of Government Code Sections 14550 through 14555.9 requiring the Commission to prepare, in conjunction with the State Treasurer’s Office (“STO”), an annual analysis of California’s bonding capacity for issuing Grant Anticipation Revenue Vehicles (“GARVEE”) bonds and notes. GARVEE bonds are capital market borrowings which are repaid from federal transportation funds that are deposited into the State Highway Account. The bonding capacity takes into account the current maximum annual debt service of the State of California (California Department of Transportation) Federal Highway Grant Anticipation Bonds (“GARVEE Bonds”) Series 2008A (“Series 2008A Bonds”).

Legislation was enacted to ensure California had the necessary state legislative authority to make use of this financing tool for accelerating high priority transportation projects. The legislation became effective January 1, 2000, and was further amended by AB 438 (Chapter 113, Statutes of 2001), AB 3026 (Chapter 438, Statutes of 2002), SB 1098 (Chapter 212, Statutes of 2004), and SB 1507 (Chapter 793, Statutes of 2004).

The issuance of additional GARVEE bonds is subject to Government Code Section 14553.4, which states that the State Treasurer may not authorize the issuance of additional bonds if the annual debt service on all outstanding GARVEE obligations would exceed 15 percent of the total amount of federal transportation funds deposited into the State Highway Account in the State Transportation Fund for any consecutive 12-month period within the preceding 24 months. Thus, current and future bonding capacity analyses must take place in the context of this “statutory cap.”

There are other factors which also affect bonding capacity, such as maturity structures, interest rates, and policy decisions. Accordingly, these analyses continue the approach of prior analyses by providing “sensitivity analyses” under different scenarios, with varying assumptions for maturity dates and interest rates. This method should continue to assist the Commission in examining and responding to future applications under the context of alternative scenarios.

On March 10, 2004, the State of California (“the State”) issued \$614,850,000 of GARVEE Bonds Series 2004A (“Series 2004A Bonds”) in order to pay a portion of the costs of acquisition of right-of-way and/or construction costs for eight federal-aid State Transportation Improvement Program (“STIP”) projects approved by the Commission. The Series 2004A Bonds fully matured on February 1, 2015 and all eight projects have been completed. On October 16, 2008, the State issued a second series of GARVEE Bonds, the Series 2008A Bonds, in the amount of \$97,635,000. As of April 1, 2016, the Series 2008A Bonds have an outstanding principal balance of \$40,345,000. The maximum annual debt service of the outstanding Series 2008A Bonds is \$11,392,793.75 in Fiscal Year 2017-18. The Series 2008A Bonds carry underlying ratings of ‘A2’ from Moody’s Investors Service, ‘AA’ from Standard & Poor’s, and ‘A+’ from Fitch Ratings.

The analyses for 2016 show a bonding capacity ranging from a low of approximately \$2.90 billion to a high of approximately \$5.51 billion under varying market conditions and amortization periods. The \$2.90 billion bonding capacity level results from a 6-year amortization with an assumed interest rate of 2.51 percent under a Market Sensitivity Case scenario, and the \$5.51 billion bonding capacity level results from a 12-year amortization with an assumed interest rate of 2.16 percent under a Base Case scenario.

The 2016 analyses show that the bonding capacity has decreased by approximately 5.3 percent for a 6-year final maturity amortization period when compared to the same analyses of 2015, and has decreased by approximately 4.5 percent for a 12-year final maturity amortization period when compared to the same analyses of 2015. The principal factor contributing to the decrease in bonding capacity from the 2015 analyses is that the highest consecutive 12 months of pledged revenue deposits into the State Highway Account from January 2014 through December 2015 decreased by more than \$212 million when compared to the amount used in the 2015 analyses for the period January 2013 through December 2014.

These analyses demonstrate that a wide range of circumstances, including policy, revenues, and market factors, can affect the existing capacity for future State GARVEE financings. Therefore, the analyses should be used as a tool for understanding the implications of alternative project applications and the related potential GARVEE bond structures that the Commission may be asked to consider over the coming year.

I. Purpose of Analyses

The following analyses are provided to assist the Commission in meeting the requirements of SB 928 (Chapter 862), sponsored by the STO to ensure that the State has the necessary legislative authority to make use of this financing tool for accelerating high priority transportation projects. The analyses relate specifically to the requirements in Section 14553(b) of the Government Code, pursuant to which the Commission and the STO shall annually prepare an analysis of the bonding capacity of federal transportation funds deposited in the State Highway Account in the State Transportation Fund. The analyses have been performed consistent with the GARVEE bonds bonding capacity guidelines provided in Government Code Section 14553.4, whereby the STO may not authorize the issuance of additional GARVEE bonds if the annual debt service on all outstanding GARVEE obligations in any fiscal year would exceed 15 percent of the total amount of federal transportation funds deposited into the State Highway Account in the State Transportation Fund for any consecutive 12-month period within the preceding 24 months (the “statutory cap”).

The following analyses are intended to measure the capacity of the State Highway Account to support future issuance of GARVEE bonds, given:

1. the historical record of federal deposits to the State Highway Account;
2. requirements preceding any issuance of additional bonds under the Master Trust Indenture; and
3. the statutory cap on total outstanding GARVEE bonds.

II. The Series 2008A GARVEE Financing

The Series 2008A Bonds are secured by the Master Trust Indenture dated February 1, 2004, as amended and supplemented by a Second Supplemental Indenture dated October 1, 2008, by and among the State Treasurer, the Commission and the California Department of Transportation (“Department”). The Series 2008A Bonds and all future bonds and obligations issued under the Master Trust Indenture are secured solely by the Trust Estate, as defined in the Master Trust Indenture, which consists solely of federal transportation funds. The primary source of federal transportation funds is the amount appropriated to the State by the federal government pursuant to Federal Aid Authorization, pursuant to Title 23 of the U.S. Code authorizing federal funding of state transportation projects.

The Department entered into a Memorandum of Agreement with the Federal Highway Administration (“FHWA”) in anticipation of reimbursement by FHWA for debt service and other bond-related costs associated with the federal-aid projects approved by the FHWA.

The Master Trust Indenture provides for the issuance of additional bonds on parity with each outstanding series of GARVEE Bonds. Any additional parity bonds or other bonds issued on a basis subordinate to the outstanding GARVEE Bonds must comply with the statutory cap.

The Series 2008A Bonds provided \$98,000,000 for the construction of two federal-aid State Highway Operation and Protection Program (“SHOPP”) projects approved by the Commission: Placer County – Interstate 80 Pavement Rehabilitation and Nevada and Sierra Counties – Interstate 80 Pavement Rehabilitation. Both projects have been completed.

III. Need for Sensitivity Analyses

There are multiple factors that will influence the State's future capacity to issue GARVEE bonds. These factors include the final maturity, interest rates and the available revenues for the additional bonds test. For this reason, no single bonding capacity analysis is sufficient for purposes of guiding the Commission's evaluation of the potential for future use of GARVEE bonds. In order to facilitate an informed consideration of future applications with structures and terms not yet known to the Commission, we have performed a series of "sensitivity analyses" under alternative scenarios. The final maturity of the bonds and the assumed interest rates are the primary variable factors that are incorporated into our sensitivity analyses.

IV. Information Sources

Pledged Revenues:

In performing these bonding capacity analyses, the STO is using data obtained from the Department regarding deposits into the State Highway Account in the State Transportation Fund from federal transportation funds. The amounts provided by the Department represent federal funds that can be legally pledged under the Master Trust Indenture for payment of the Bonds. The federal transportation funds that are legally available for payment of debt service include those derived from Federal Aid Authorization under Title 23, including apportioned funds (i.e., National Highway System, bridges and the federal surface transportation programs, and amounts available under minimum guarantees) with corresponding Obligation Authority.

To be consistent with Section 14553.4 of the Government Code, the total annual federal aid receipts, without exceptions, have been used to calculate the annual GARVEE bonding capacity. This information was provided for this report on a monthly basis over the period of January 2014 through December 2015. See **Attachments A-1 and A-2** for the monthly deposits data and related calculations. The additional bonds test is based on the highest consecutive 12 months of pledged revenue deposits during the prior 24-month period. These historic annual deposits are a known quantity at any given point in time, but are clearly subject to change over time, and must be re-examined at the time of each potential GARVEE bond issuance.

Final Maturities:

The analyses in the report assume that any additional GARVEE bonds issued in 2016 will have final maturities in 2022 and 2028.

Interest Rate Assumptions:

Estimates of potential interest costs under various scenarios were developed by the STO based on the 'A' high-grade municipal bond benchmark published by Municipal Market Data ("MMD"), a widely used industry benchmark. The interest rate assumptions used for the analyses are based on the weighted average coupon, using a level debt solution for each final maturity (or amortization period), which reflects the structure of the Series 2008A Bonds.

V. Summary of Alternative Assumptions

For the 2016 bonding capacity analyses, we used the MMD ‘A’ municipal bond benchmark. Since the Series 2008A Bonds carry underlying ratings of ‘A2’ from Moody’s Investors Service, ‘AA’ from Standard & Poor’s, and ‘A+’ from Fitch Ratings, we have assumed that a new issuance of GARVEE Bonds in the current environment would also carry underlying ratings that are split among the ‘A’ and ‘AA’ grades.

The two alternative scenarios for market conditions used in these analyses are as follows:

1. **Base Case:** Interest rates are based on the March 1, 2016 MMD ‘A’ municipal bond benchmark.
2. **Market Sensitivity Case:** Base Case plus 100 basis points.

Many observers believe that over time interest rates could increase from the current levels. For this reason, and based on the expected short-term maturity structure of the State’s current and future GARVEE obligations, a 100 basis point increase in interest rates is used for the market sensitivity analyses.

Two alternatives for the final maturity of the bonds were analyzed for each case. The table below summarizes the range of assumptions for the sensitivity analyses. The different scenarios for each factor combine for a total of four different analyses.

Factors	Range of Assumptions
Final Maturity	Two scenarios: at 6 and 12 years from date of issuance
Assumed Interest Rates	Two scenarios: one at ‘A’ MMD market rates on March 1, 2016 and one at 100 basis points above the March 1, 2016 ‘A’ MMD market rates

See **Attachment B** for the detailed assumptions used in each sensitivity analysis.

It should also be noted that the current analyses, by necessity, require significant simplification as compared to the myriad of structuring nuances that would be involved in actual bond sales. As a result, certain ambiguities or alternative interpretations could lead to somewhat differing results in practice. One example of a simplification, common to all scenarios, is the assumption that all GARVEE bonds within the capacity of a given scenario would be issued in a single year and not staggered over multiple years, as typically would be expected in a bonding program of significant magnitude.

If, instead, such bonds were staggered and this financing structure was assumed to have a fixed “end date” represented by the assumed final maturity used in each scenario, each resulting measure of maximum bonding capacity would have to be adjusted downward. This would be necessary because the GARVEE bonds issued in subsequent years would have a shorter period during which to amortize principal before the fixed end date. This would increase the annual debt service necessary for a given par amount of bonds, causing a reduction in total bonding capacity, assuming a fixed amount of annual revenues for each scenario.

Alternatively, this simplification would not have this constraint on capacity if future financings were assumed to be structured on a “rolling maturity” basis; that is, with each GARVEE bond issued in subsequent years within each scenario having exactly the same underlying terms, such as total years to maturity and interest rate, regardless of the timing of any future bond issuance. This latter simplification would also assume a fixed amount of annual revenues for each scenario.

This discussion is offered as an example, which is by no means exhaustive, of the implications of the necessary simplifications involved in any analysis of bonding capacity given current uncertainty about the actual conditions that will exist at the time of any future issuance of GARVEE bonds or obligations. Therefore, care should be exercised in using these analyses to avoid erroneous interpretations or conclusions.

VI. Summary of Results

As of March 1, 2016, the weighted average interest rate for ‘A’ rated bonds with a 6-year final maturity was 1.51 percent (a decrease of 0.126 percent compared to last year’s level) and with a 12-year final maturity was 2.16 percent (a decrease of 0.203 percent compared to last year’s level). These slight decreases in assumed interest rates from those used for the 2015 analyses were significantly offset by the fact that the highest consecutive 12 months of annual deposits in the State Highway Account during the past 24 months was more than \$212 million less than was the same factor used for the 2015 analyses. This is due to total deposits into the State Highway Account during 2014-2015 being almost \$104 million less than total deposits into the State Highway Account during 2013-2014 (see **Attachment A-2**).

The analyses show that a bond issuance with a 6-year maturity corresponds to a bonding capacity ranging from approximately \$2.90 billion (Market Sensitivity Case) to approximately \$3.00 billion (Base Case). These levels represent a decrease of approximately \$162.38 million and \$167.71 million, respectively, compared to 2015, or a decrease of approximately 5.3 percent for a 6-year maturity compared to last year’s levels.

The Commission policy established 12 years as the maximum maturity for GARVEE bonds. If future bond issues are structured with a 12-year amortization period consistent with the current Commission policy and at current interest rate levels, the remaining capacity for issuance of GARVEE bonds would be from approximately \$5.19 billion (Market Sensitivity Case) to approximately \$5.51 billion (Base Case). These levels represent a decrease of approximately \$247.94 million and \$261.35 million, respectively, compared to 2015, or a decrease of approximately 4.6 percent for a 12-year maturity compared to last year’s levels.

Under the current analyses, a longer amortization period would increase the additional bonding capacity. If the Commission policy changes to allow a longer maximum maturity, the bonding capacity would change accordingly. Furthermore, the Department projects that the annual federal receipts will remain at the \$3.4 billion level in calendar year 2016, so total bonding capacity levels are expected to remain high continuing into 2017 even if interest rates were to rise during that time.

The following table summarizes key results of our analyses based on the actual federal aid receipts deposited into the State Highway Account in 2015. Detailed worksheets supporting the results can be found in **Attachments C, D-1, and D-2**.

Summary of Results for GARVEE Bonding Capacity Sensitivity Analyses		
Final Maturity Amortization Period	Base Case: March 1, 2016 'A' MMD Scale	Market Sensitivity Case: Base Case plus 100 Basis Points
6 years	\$3.00 billion	\$2.90 billion
12 years	\$5.51 billion	\$5.19 billion

VII. California Transportation Commission Policy

The Commission adopted a GARVEE policy in December 2003. This policy extends through the Federal Transportation Reauthorization Act. The current transportation reauthorization act has been extended through September 30, 2020.

The policy, contained in Commission Resolution No. G-03-21, is as follows:

- Debt Limit.** The Commission limits annual GARVEE debt service to 15 percent of qualifying federal revenues. This limit will be calculated on the basis described in Section 14553.4 of the Government Code (i.e., 15 percent of the total amount of federal transportation funds deposited in the State Highway Account for any consecutive 12-month period within the preceding 24 months). In 2004, SB 1507 amended the statutory cap from a 30 percent limit to a 15 percent limit, which aligned it with the Commission's policy.
- Term.** Each bond is structured for debt service payments over a term of no more than 12 years.
- Project Selection.** The Commission selects projects for accelerated construction through the use of GARVEE bonding. The selection will be made through the programming process for the STIP and the SHOPP. The Commission will select projects that are major improvements to corridors and gateways for interregional travel and goods movement. Major improvements include projects that increase capacity, reduce travel time, or provide long-life rehabilitation of key bridges or roadways.

VIII. Recent Events

The Department does not anticipate any new GARVEE bond issuance in the near future.

IX. Conclusion

As the above analyses show, the ultimate capacity existing for the State's future GARVEE financings will depend on a wide range of circumstances over time, including market conditions, maturity structures, revenues, and other factors that may be considered by the Commission.

We are hopeful that these analyses will be useful in considering the structuring options that are available for GARVEE financings, in addition to meeting the immediate goal of assisting the Commission in preparing its annual report.

ATTACHMENT A-1
 FEDERAL DEPOSITS INTO THE
 STATE HIGHWAY ACCOUNT

**Cumulative 12-Month
 Federal Deposits into the State Highway Account
 Over 24-Month Period, ending December 31, 2015**

Period Covered	12-Month Total Revenues Deposited	
Jan 14 - Dec 14	\$3,468,062,693.10	
Feb 14 - Jan 15	\$3,467,088,644.88	
Mar 14 - Feb 15	\$3,447,350,818.89	
Apr 14 - Mar 15	\$3,468,328,468.45	
May 14 - Apr 15	\$3,343,264,903.33	
Jun 14 - May 15	\$3,351,731,927.88	
Jul 14 - Jun 15	\$3,399,554,716.89	
Aug 14 - Jul 15	\$3,409,197,554.85	
Sep 14 - Aug 15	\$3,414,844,379.11	
Oct 14 - Sep 15	\$3,502,455,305.90	
Nov 14 - Oct 15	\$3,303,577,459.36	Lowest 12-Month Total
Dec 14 - Nov 15	\$3,528,655,786.42	
Jan 15 - Dec 15	\$3,583,749,469.76	Highest 12-Month Total
	\$3,437,527,856.06	Average 12-Month Total

Source: California Department of Transportation

ATTACHMENT A - 2
FEDERAL DEPOSITS INTO THE
STATE HIGHWAY ACCOUNT

Monthly Deposits of Legally Pledged Federal Transportation Fund					
	2011	2012	2013	2014	2015
Month	Deposit Amount	Deposit Amount	Deposit Amount	Deposit Amount	Deposit Amount
January	\$389,063,404.04	\$289,148,449.88	\$266,012,158.70	\$317,157,116.05	\$316,183,067.83
February	\$155,558,369.65	\$213,989,165.30	\$200,005,121.39	\$257,137,710.51	\$237,399,884.52
March	\$236,920,034.82	\$438,321,351.25	\$278,582,563.78	\$244,784,115.40	\$265,761,764.96
April	\$185,631,604.91	\$231,244,325.22	\$340,139,440.60	\$336,212,643.54	\$211,149,078.42
May	\$399,251,077.85	\$312,928,985.45	\$270,273,817.64	\$293,067,814.33	\$301,534,838.88
June	\$303,302,807.89	\$269,369,114.62	\$285,289,981.72	\$220,385,373.69	\$268,208,162.70
July	\$183,338,941.67	\$450,815,965.63	\$362,969,334.38	\$356,485,925.72	\$366,128,763.68
August	\$582,687,851.42	\$403,368,240.18	\$296,088,386.72	\$308,348,149.28	\$313,994,973.54
September	\$315,712,808.68	\$406,397,077.43	\$368,002,029.29	\$316,054,720.78	\$403,665,647.57
October	\$414,379,161.36	\$398,397,382.31	\$480,449,043.79	\$380,153,846.50	\$181,275,999.96
November	\$456,066,414.04	\$284,658,403.31	\$256,150,740.49	\$243,240,674.72	\$468,319,001.78
December	\$251,221,938.27	\$222,659,793.42	\$283,721,485.26	\$195,034,602.58	\$250,128,285.92
TOTAL	\$3,873,134,414.60	\$3,921,298,254.00	\$3,687,684,103.76	\$3,468,062,693.10	\$3,583,749,469.76
Monthly Average	\$322,761,201.22	\$326,774,854.50	\$307,307,008.65	\$289,005,224.43	\$298,645,789.15

Source: California Department of Transportation.

ATTACHMENT B
DETAILED ASSUMPTIONS FOR
SENSITIVITY ANALYSES

Summary of Assumptions for GARVEE Bonding Capacity Sensitivity Analyses			
Base Case – Current Market Conditions			
	Factors	Assumptions	Comments
	Final Maturity	6 and 12 years	Analyses run at each final maturity listed at left.
	Interest Rates	1.51% and 2.16%	Rates indicated relate to each respective final maturity above; listed rates represent the weighted average coupon for a bond issue sizing with level annual debt service.
	Annual Revenues	\$3,583,749,469.76	The Treasurer may not authorize the issuance of the bonds if the annual debt service on all outstanding GARVEE obligations would exceed 15 percent of the State’s historical annual deposits in the State Highway Account from federal funding.

Market Sensitivity Case – Alternative Market Conditions			
	Factors	Assumptions	Comments
	Final Maturity	6 and 12 years	Analyses run at each final maturity listed at left.
	Interest Rates	2.51% and 3.16%	Rates indicated relate to each respective final maturity above; listed rates represent the weighted average coupon for a bond issue sizing with level annual debt service.
	Annual Revenues	\$3,583,749,469.76	The Treasurer may not authorize the issuance of the bonds if the annual debt service on all outstanding GARVEE obligations would exceed 15 percent of the State’s historical annual deposits in the State Highway Account from federal funding.

ATTACHMENT C
DETAILED WORKSHEET FOR
SENSITIVITY ANALYSES

OVERVIEW OF GARVEE BONDING CAPACITY ANALYSES	
<p>The bond test requires that the annual payment obligations of all outstanding notes in any fiscal year do not exceed 15 percent of the total amount of Federal Transportation Funds deposited into the State Highway Account for the highest consecutive 12-month period within the preceding 24 months. The maximum Annual Debt Service on the outstanding Bonds has been subtracted from the highest 12 consecutive months of deposits during the preceding 24 months in order to calculate the remaining Additional Debt Capacity.</p>	
	(Dollars in Thousands)
Base Case	
Maximum Par Amount of Bonding Capacity	\$2,996,972
Interest rate	1.51%
Maximum Assumed Annual Debt Service *	\$526,169
Term of Bond Issue	6
Market Sensitivity	
Maximum Par Amount of Bonding Capacity	\$2,897,530
Interest rate	2.51%
Maximum Assumed Annual Debt Service *	\$526,169
Term of Bond Issue	6
Base Case	
Maximum Par Amount of Bonding Capacity	\$5,509,683
Interest rate	2.16%
Maximum Assumed Annual Debt Service *	\$526,169
Term of Bond Issue	12
Market Sensitivity	
Maximum Par Amount of Bonding Capacity	\$5,187,406
Interest rate	3.16%
Maximum Assumed Annual Debt Service *	\$526,169
Term of Bond Issue	12
*15% of legally-pledged Federal Transportation Funds deposited into the State Highway Account less maximum annual debt service for the Series 2008A Bonds.	
(white / non-shaded)	= Base Case Scenarios based on March 1, 2016 'A' MMD Scale
(yellow / shaded)	= Market Sensitivity Case Scenarios based on March 1, 2016 'A' MMD Scale Plus 100 Basis Points

ATTACHMENT D-1
DETAILED SUMMARY TABLES
FOR SENSITIVITY ANALYSES

GARVEE BONDING CAPACITY

Base Case

Highest 12-Month Revenue (\$ in 000's)	\$3,583,749
Debt Service Test (15% of Revenue)	\$537,562
Less: Existing Maximum Annual Series 2008A D/S	-\$11,393
Remaining Maximum Annual Debt Service Capacity	\$526,169

(Dollars in Thousands)

	6 Years	12 Years
Assumed Date of Issuance	2016	2016
Assumed Final Maturity	2022	2028
Assumed Interest Rate ⁽¹⁾	1.51%	2.16%
Par Capacity	\$2,996,972	\$5,509,683
Annual Debt Service Required	\$526,169	\$526,169

⁽¹⁾ The assumed interest rates are based on the March 1, 2016 'A' MMD bond scale. The rates used are the weighted average coupon for a level debt service bond sizing based upon the final maturity in each scenario.

ATTACHMENT D-2
DETAILED SUMMARY TABLES
FOR SENSITIVITY ANALYSES

GARVEE BONDING CAPACITY

Market Sensitivity Case

Highest 12-Month Revenue (\$ in 000's)	\$3,583,749
Debt Service Test (15% of Revenue)	\$537,562
Less: Existing Maximum Annual Series 2008A D/S	-\$11,393
Remaining Maximum Annual Debt Service Capacity	\$526,169

(Dollars in Thousands)

	6 Years	12 Years
Assumed Year of Issuance	2016	2016
Assumed Final Maturity	2022	2028
Assumed Interest Rate ⁽¹⁾	2.51%	3.16%
Par Capacity	\$2,897,530	\$5,187,406
Annual Debt Service Required	\$526,169	\$526,169

⁽¹⁾ The assumed interest rates are based on the March 1, 2016 'A' MMD bond scale (increased by 100 basis points (1%) for market fluctuations). The rates used are the weighted average coupon for a level debt service bond sizing based upon the final maturity in each scenario.