Josh Mandel, State Treasurer of Ohio

Finance 310: Understanding the Finer Details of Debt Structuring

Center for Public Investment Management

CPIM Academy 2011

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Review of Bond Basics

What is a bond?

Bond: A bond is a debt security which obligates the issuer to pay interest (usually semi-annually) and to repay the principal amount when the debt matures.

Note: Bonds are usually stated in values of $1,000; although bonds issued by municipalities (cities, counties, schools) are usually issued in $5,000 increments.

Review of Bond Basics

How are bonds structured?

- *Par*: Issued or sold at 100% of its face value
- *Premium*: Issued or sold at a price above 100% of face
- *Discount*: Issued or sold at a price below 100% of face
- *Serial Bond*: Full principal repaid only at maturity
- *Term Bond*: Partial principal repaid each year of the term of the bond
- *Capital Appreciation Bond*: Issued at a steep discount, pays no semi-annual interest, matures at face value
- *Optional Redemption "Callable"*: May be prepaid at issuer's option

Issue With Serial Bonds & a Term Bond; With 6/1/2021 Call Date

Maturity	Type of Bond	Coupon	Yield	Issuance Value	Par	Maturity Value	Price	Dollar Price
06/01/2012	Serial Coupon	2.000%	1.000%	45,000.00	100.000%	45,000.00	100.992%	45,446.40
06/01/2013	Serial Coupon	2.000%	1.250%	45,000.00	100.000%	45,000.00	101.476%	45,664.20
06/01/2014	Serial Coupon	2.000%	1.550%	45,000.00	100.000%	45,000.00	101.314%	45,591.30
06/01/2015	Serial Coupon	2.500%	2.050%	45,000.00	100.000%	45,000.00	101.719%	45,773.55
06/01/2016	Serial Coupon	2.500%	2.250%	50,000.00	100.000%	50,000.00	101.176%	50,588.00
06/01/2017	Serial Coupon	2.500%	2.550%	50,000.00	100.000%	50,000.00	99.723%	49,861.50
06/01/2018	Serial Coupon	2.500%	2.800%	50,000.00	100.000%	50,000.00	98.104%	49,052.00
06/01/2019	Serial Coupon	3.000%	3.000%	50,000.00	100.000%	50,000.00	100.000%	50,000.00
06/01/2020	Serial Coupon	3.000%	3.350%	55,000.00	100.000%	55,000.00	97.299%	53,514.45
06/01/2021	Serial P-CAB	-	4.000%	37,013.35	100.000%	55,000.00	67.297%	37,013.35
06/01/2022	Serial Coupon	3.500%	3.800%	55,000.00	100.000%	55,000.00	97.323%	53,527.65
06/01/2023	Serial Coupon	3.500%	3.950%	55,000.00	100.000%	55,000.00	95.732%	52,652.60
06/01/2024	Serial Coupon	4.000%	4.100%	60,000.00	100.000%	60,000.00	99.000%	59,400.00
06/01/2025	Serial Coupon	4.000%	4.200%	60,000.00	100.000%	60,000.00	97.899%	58,739.40
06/01/2026	Serial Coupon	4.000%	4.300%	65,000.00	100.000%	65,000.00	96.708%	62,860.20
06/01/2027	Serial Coupon	4.500%	4.400%	65,000.00	100.000%	65,000.00	100.802% c	65,521.30
06/01/2028	Serial Coupon	4.500%	4.500%	70,000.00	100.000%	70,000.00	100.000%	70,000.00
06/01/2029	Serial Coupon	5.000%	4.600%	70,000.00	100.000%	70,000.00	103.177% c	72,223.90
06/01/2030	Serial Coupon	5.000%	4.700%	75,000.00	100.000%	75,000.00	102.371% c	76,778.25
06/01/2031	Serial Coupon	5.000%	4.800%	80,000.00	100.000%	80,000.00	101.573% c	81,258.40
06/01/2036	Term 1 Coupon	5.250%	5.250%	460,000.00	100.000%	460,000.00	100.000%	460,000.00
Total		-	-	**$1,587,013.35**	-	**$1,605,000.00**	- -	**$1,585,466.45**

06/01/2032	85,000.00	5.250%
06/01/2033	90,000.00	5.250%
06/01/2034	90,000.00	5.250%
06/01/2035	95,000.00	5.250%
06/01/2036	100,000.00	5.250%

Sinking Fund Payments For $460,000 Term Bond

"Coupon" Rate Is the Interest Paid Each Year (One-Half Semi-Annually)

Maturity	Type of Bond	Coupon	Yield	Issuance Value	Par	Maturity Value	Price	Dollar Price
06/01/2012	Serial Coupon	2.000%	1.000%	45,000.00	100.000%	45,000.00	100.992%	45,446.40
06/01/2013	Serial Coupon	2.000%	1.250%	45,000.00	100.000%	45,000.00	101.476%	45,664.20
06/01/2014	Serial Coupon	2.000%	1.550%	45,000.00	100.000%	45,000.00	101.314%	45,591.30
06/01/2015	Serial Coupon	2.500%	2.050%	45,000.00	100.000%	45,000.00	101.719%	45,773.55
06/01/2016	Serial Coupon	2.500%	2.250%	50,000.00	100.000%	50,000.00	101.176%	50,588.00
06/01/2017	Serial Coupon	2.500%	2.550%	50,000.00	100.000%	50,000.00	99.723%	49,861.50
06/01/2018	Serial Coupon	2.500%	2.800%	50,000.00	100.000%	50,000.00	98.104%	49,052.00
06/01/2019	Serial Coupon	3.000%	3.000%	50,000.00	100.000%	50,000.00	100.000%	50,000.00
06/01/2020	Serial Coupon	3.000%	3.350%	55,000.00	100.000%	55,000.00	97.299%	53,514.45
06/01/2021	Serial P-CAB	-	4.000%	37,013.35	100.000%	55,000.00	67.297%	37,013.35
06/01/2022	Serial Coupon	3.500%	3.800%	55,000.00	100.000%	55,000.00	97.323%	53,527.65
06/01/2023	Serial Coupon	3.500%	3.950%	55,000.00	100.000%	55,000.00	95.732%	52,652.60
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06/01/2027	Serial Coupon	4.500%	4.400%	65,000.00	100.000%	65,000.00	100.802% c	65,521.30
06/01/2028	Serial Coupon	4.500%	4.500%	70,000.00	100.000%	70,000.00	100.000%	70,000.00
06/01/2029	Serial Coupon	5.000%	4.600%	70,000.00	100.000%	70,000.00	103.177% c	72,223.90
06/01/2030	Serial Coupon	5.000%	4.700%	75,000.00	100.000%	75,000.00	102.371% c	76,778.25
06/01/2031	Serial Coupon	5.000%	4.800%	80,000.00	100.000%	80,000.00	101.573% c	81,258.40
06/01/2036	Term 1 Coupon	5.250%	5.250%	460,000.00	100.000%	460,000.00	100.000%	460,000.00
Total		-	-	**$1,587,013.35**	-	**$1,605,000.00**	- -	**$1,585,466.45**

Capital Appreciation Bond (CAB) No Semi Annual Interest Payment

Maturity	Type of Bond	Coupon	Yield	Issuance Value	Par	Maturity Value	Price	Dollar Price
06/01/2012	Serial Coupon	2.000%	1.000%	45,000.00	100.000%	45,000.00	100.992%	45,446.40
06/01/2013	Serial Coupon	2.000%	1.250%	45,000.00	100.000%	45,000.00	101.476%	45,664.20
06/01/2014	Serial Coupon	2.000%	1.550%	45,000.00	100.000%	45,000.00	101.314%	45,591.30
06/01/2015	Serial Coupon	2.500%	2.050%	45,000.00	100.000%	45,000.00	101.719%	45,773.55
06/01/2016	Serial Coupon	2.500%	2.250%	50,000.00	100.000%	50,000.00	101.176%	50,588.00
06/01/2017	Serial Coupon	2.500%	2.550%	50,000.00	100.000%	50,000.00	99.723%	49,861.50
06/01/2018	Serial Coupon	2.500%	2.800%	50,000.00	100.000%	50,000.00	98.104%	49,052.00
06/01/2019	Serial Coupon	3.000%	3.000%	50,000.00	100.000%	50,000.00	100.000%	50,000.00
06/01/2020	Serial Coupon	3.000%	3.350%	55,000.00	100.000%	55,000.00	97.299%	53,514.45
06/01/2021	Serial P-CAB	-	4.000%	37,013.35	100.000%	55,000.00	67.297%	37,013.35
06/01/2022	Serial Coupon	3.500%	3.800%	55,000.00	100.000%	55,000.00	97.323%	53,527.65
06/01/2023	Serial Coupon	3.500%	3.950%	55,000.00	100.000%	55,000.00	95.732%	52,652.60
06/01/2024	Serial Coupon	4.000%	4.100%	60,000.00	100.000%	60,000.00	99.000%	59,400.00
06/01/2025	Serial Coupon	4.000%	4.200%	60,000.00	100.000%	60,000.00	97.899%	58,739.40
06/01/2026	Serial Coupon	4.000%	4.300%	65,000.00	100.000%	65,000.00	96.708%	62,860.20
06/01/2027	Serial Coupon	4.500%	4.400%	65,000.00	100.000%	65,000.00	100.802% c	65,521.30
06/01/2028	Serial Coupon	4.500%	4.500%	70,000.00	100.000%	70,000.00	100.000%	70,000.00
06/01/2029	Serial Coupon	5.000%	4.600%	70,000.00	100.000%	70,000.00	103.177% c	72,223.90
06/01/2030	Serial Coupon	5.000%	4.700%	75,000.00	100.000%	75,000.00	102.371% c	76,778.25
06/01/2031	Serial Coupon	5.000%	4.800%	80,000.00	100.000%	80,000.00	101.573% c	81,258.40
06/01/2036	Term 1 Coupon	5.250%	5.250%	460,000.00	100.000%	460,000.00	100.000%	460,000.00
Total		-	-	**$1,587,013.35**	-	**$1,605,000.00**	- -	**$1,585,466.45**

CAB Value Accretes Each 6 Months, But No Cash Flows, But Needed For Accounting Purposes

Accreted Value Table

DATE	06/01/2021 @ 4.0000202 %
06/01/2011	37,013.35
12/01/2011	37,753.62
06/01/2012	38,508.70
12/01/2012	39,278.87
06/01/2013	40,064.46
12/01/2013	40,865.75
06/01/2014	41,683.07
12/01/2014	42,516.73
06/01/2015	43,367.07
12/01/2015	44,234.42
06/01/2016	45,119.11
12/01/2016	46,021.50
06/01/2017	46,941.93
12/01/2017	47,880.78
06/01/2018	48,838.40
12/01/2018	49,815.17
06/01/2019	50,811.48
12/01/2019	51,827.71
06/01/2020	52,864.27
12/01/2020	53,921.56
06/01/2021	55,000.00

"Yield" Is the Net Cost to the Issuer (Return to the investor) aka "Yield to Maturity" or "Yield To Call"

Maturity	Type of Bond	Coupon	Yield	Issuance Value	Par	Maturity Value	Price		Dollar Price
06/01/2012	Serial Coupon	2.000%	1.000%	45,000.00	100.000%	45,000.00	100.992%		45,446.40
06/01/2013	Serial Coupon	2.000%	1.250%	45,000.00	100.000%	45,000.00	101.476%		45,664.20
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06/01/2016	Serial Coupon	2.500%	2.250%	50,000.00	100.000%	50,000.00	101.176%		50,588.00
06/01/2017	Serial Coupon	2.500%	2.550%	50,000.00	100.000%	50,000.00	99.723%		49,861.50
06/01/2018	Serial Coupon	2.500%	2.800%	50,000.00	100.000%	50,000.00	98.104%		49,052.00
06/01/2019	Serial Coupon	3.000%	3.000%	50,000.00	100.000%	50,000.00	100.000%		50,000.00
06/01/2020	Serial Coupon	3.000%	3.350%	55,000.00	100.000%	55,000.00	97.299%		53,514.45
06/01/2021	Serial P-CAB	-	4.000%	37,013.35	100.000%	55,000.00	67.297%		37,013.35
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06/01/2025	Serial Coupon	4.000%	4.200%	60,000.00	100.000%	60,000.00	97.899%		58,739.40
06/01/2026	Serial Coupon	4.000%	4.300%	65,000.00	100.000%	65,000.00	96.708%		62,860.20
06/01/2027	Serial Coupon	4.500%	4.400%	65,000.00	100.000%	65,000.00	100.802%	c	65,521.30
06/01/2028	Serial Coupon	4.500%	4.500%	70,000.00	100.000%	70,000.00	100.000%		70,000.00
06/01/2029	Serial Coupon	5.000%	4.600%	70,000.00	100.000%	70,000.00	103.177%	c	72,223.90
06/01/2030	Serial Coupon	5.000%	4.700%	75,000.00	100.000%	75,000.00	102.371%	c	76,778.25
06/01/2031	Serial Coupon	5.000%	4.800%	80,000.00	100.000%	80,000.00	101.573%	c	81,258.40
06/01/2036	Term 1 Coupon	5.250%	5.250%	460,000.00	100.000%	460,000.00	100.000%		460,000.00
Total		-	-	**$1,587,013.35**	-	**$1,605,000.00**	-	-	**$1,585,466.45**

"True Interest Cost "(TIC) Is the Time Value Average of the Yields Required of the Issuer

Maturity	Type of Bond	Coupon	Yield	Issuance Value	Par	Maturity Value	Price		Dollar Price
06/01/2012	Serial Coupon	2.000%	1.000%	45,000.00	100.000%	45,000.00	100.992%		45,446.40
06/01/2013	Serial Coupon	2.000%	1.250%	45,000.00	100.000%	45,000.00	101.476%		45,664.20
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06/01/2015	Serial Coupon	2.500%	2.050%	45,000.00	100.000%	45,000.00	101.719%		45,773.55
06/01/2016	Serial Coupon	2.500%	2.250%	50,000.00	100.000%	50,000.00	101.176%		50,588.00
06/01/2017	Serial Coupon	2.500%	2.550%	50,000.00	100.000%	50,000.00	99.723%		49,861.50
06/01/2018	Serial Coupon	2.500%	2.800%	50,000.00	100.000%	50,000.00	98.104%		49,052.00
06/01/2019	Serial Coupon	3.000%	3.000%	50,000.00	100.000%	50,000.00	100.000%		50,000.00
06/01/2020	Serial Coupon	3.000%	3.350%	55,000.00	100.000%	55,000.00	97.299%		53,514.45
06/01/2021	Serial P-CAB	-	4.000%	37,013.35	100.000%	55,000.00	67.297%		37,013.35
06/01/2022	Serial Coupon	3.500%	3.800%	55,000.00	100.000%	55,000.00	97.323%		53,527.65
06/01/2023	Serial Coupon	3.500%	3.950%	55,000.00	100.000%	55,000.00	95.732%		52,652.60
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06/01/2028	Serial Coupon	4.500%	4.500%	70,000.00	100.000%	70,000.00	100.000%		70,000.00
06/01/2029	Serial Coupon	5.000%	4.600%	70,000.00	100.000%	70,000.00	103.177%	c	72,223.90
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06/01/2036	Term 1 Coupon	5.250%	5.250%	460,000.00	100.000%	460,000.00	100.000%		460,000.00
Total		-	-	**$1,587,013.35**	-	**$1,605,000.00**	-	-	**$1,585,466.45**
Average Life									14.874 Years
Average Coupon									4.6481379%
Net Interest Cost (NIC)									4.7394184%
True Interest Cost (TIC)									4.6697852%

Calculation of Premium

06/01/2013	Serial Coupon	2.000%	1.250%	45,000.00	100.000%	45,000.00	101.476%	45,664.20

Investor pays $45,664.20 but only receives back $45,000 two years later (premium of $664.20*)

Investor receives 2% per year (1% each 6 months)

2% received, less premium paid, nets a Yield, or Yield to Maturity of 1.25%

** Present value of 0.75% (difference between Coupon rate and Yield) x's face value, if discounted semi annually at the "Yield" rate (1.25%)*

Price Is Calculated Differently If Sold At a Premium & Callable ; Yield To Call Not Yield To Maturity

Maturity	Type of Bond	Coupon	Yield	Issuance Value	Par	Maturity Value	Price		Dollar Price
06/01/2012	Serial Coupon	2.000%	1.000%	45,000.00	100.000%	45,000.00	100.992%		45,446.40
06/01/2013	Serial Coupon	2.000%	1.250%	45,000.00	100.000%	45,000.00	101.476%		45,664.20
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06/01/2025	Serial Coupon	4.000%	4.200%	60,000.00	100.000%	60,000.00	97.899%		58,739.40
06/01/2026	Serial Coupon	4.000%	4.300%	65,000.00	100.000%	65,000.00	96.708%		62,860.20
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06/01/2036	Term 1 Coupon	5.250%	5.250%	460,000.00	100.000%	460,000.00	100.000%		460,000.00
Total		-	-	**$1,587,013.35**	-	**$1,605,000.00**	-	-	**$1,585,466.45**

Maturity Date	6/01/2031
Price to Maturity	102.5530000%
Price to Call (6/01/2021)	101.5730000%
Lowest Price	101.5730000%
First Available Call Date	6/01/2021
Years to First Call	10.000 Years
Yield to Maturity	4.8759805%
Yield to Call	4.8000000%

Price Sold To Investors At Issuance

Maturity	Type of Bond	Coupon	Yield	Issuance Value	Par	Maturity Value	Price		Dollar Price
06/01/2012	Serial Coupon	2.000%	1.000%	45,000.00	100.000%	45,000.00	100.992%		45,446.40
06/01/2013	Serial Coupon	2.000%	1.250%	45,000.00	100.000%	45,000.00	101.476%		45,664.20
06/01/2014	Serial Coupon	2.000%	1.550%	45,000.00	100.000%	45,000.00	101.314%		45,591.30
06/01/2015	Serial Coupon	2.500%	2.050%	45,000.00	100.000%	45,000.00	101.719%		45,773.55
06/01/2016	Serial Coupon	2.500%	2.250%	50,000.00	100.000%	50,000.00	101.176%		50,588.00
06/01/2017	Serial Coupon	2.500%	2.550%	50,000.00	100.000%	50,000.00	99.723%		49,861.50
06/01/2018	Serial Coupon	2.500%	2.800%	50,000.00	100.000%	50,000.00	98.104%		49,052.00
06/01/2019	Serial Coupon	3.000%	3.000%	50,000.00	100.000%	50,000.00	100.000%		50,000.00
06/01/2020	Serial Coupon	3.000%	3.350%	55,000.00	100.000%	55,000.00	97.299%		53,514.45
06/01/2021	Serial P-CAB	-	4.000%	37,013.35	100.000%	55,000.00	67.297%		37,013.35
06/01/2022	Serial Coupon	3.500%	3.800%	55,000.00	100.000%	55,000.00	97.323%		53,527.65
06/01/2023	Serial Coupon	3.500%	3.950%	55,000.00	100.000%	55,000.00	95.732%		52,652.60
06/01/2024	Serial Coupon	4.000%	4.100%	60,000.00	100.000%	60,000.00	99.000%		59,400.00
06/01/2025	Serial Coupon	4.000%	4.200%	60,000.00	100.000%	60,000.00	97.899%		58,739.40
06/01/2026	Serial Coupon	4.000%	4.300%	65,000.00	100.000%	65,000.00	96.708%		62,860.20
06/01/2027	Serial Coupon	4.500%	4.400%	65,000.00	100.000%	65,000.00	100.802%	c	65,521.30
06/01/2028	Serial Coupon	4.500%	4.500%	70,000.00	100.000%	70,000.00	100.000%		70,000.00
06/01/2029	Serial Coupon	5.000%	4.600%	70,000.00	100.000%	70,000.00	103.177%	c	72,223.90
06/01/2030	Serial Coupon	5.000%	4.700%	75,000.00	100.000%	75,000.00	102.371%	c	76,778.25
06/01/2031	Serial Coupon	5.000%	4.800%	80,000.00	100.000%	80,000.00	101.573%	c	81,258.40
06/01/2036	Term 1 Coupon	5.250%	5.250%	460,000.00	100.000%	460,000.00	100.000%		460,000.00
Total		-	-	**$1,587,013.35**	-	**$1,605,000.00**	-	-	**$1,585,466.45**

Net discount of $1,546.90

Net Result to Issuer

Sources Of Funds	
Par Amount of Bonds	$1,587,013.35
Total Sources	**$1,587,013.35**
Uses Of Funds	
Original Issue Discount (OID)	1,546.90
Total Underwriter's Discount (1.260%)	20,000.00
Costs of Issuance	45,000.00
Gross Bond Insurance Premium (65.0 bp)	17,447.38
Deposit to Project Construction Fund	1,500,000.00
Rounding Amount	3,019.07
Total Uses	**$1,587,013.35**

- Premiums may be needed to pay costs of issuance.
- Voted Issues are almost always sold at a net premium, since par value is set in legislation.

Optional Redemption or "Call"

- Traditional Call begins at end of year 10 and applies to all principal maturing thereafter.
- Including Call may increase interest rates by between 0 and 10 1/100ths (bp) of 1%.
- Call earlier than year 10 will raise rates by at least 10 bp.
- May require payment of a Call Premium, but has not been needed for recent issues.
- Issuer typically exercises Call in order to take advantage of lower interest rates, or if "extra" cash is available.
- Vast majority of issues are refunded.

$1,115,000 of Total Is Callable After 6/1/2021 Call Date

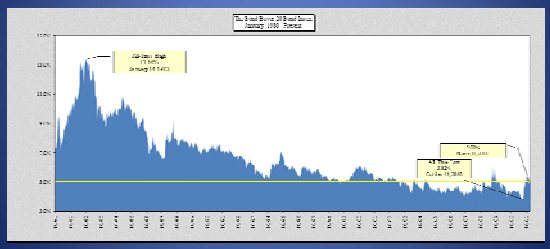
Maturity	Type of Bond	Coupon	Yield	Issuance Value	Par	Maturity Value	Price		Dollar Price
06/01/2012	Serial Coupon	2.000%	1.000%	45,000.00	100.000%	45,000.00	100.992%		45,446.40
06/01/2013	Serial Coupon	2.000%	1.250%	45,000.00	100.000%	45,000.00	101.476%		45,664.20
06/01/2014	Serial Coupon	2.000%	1.550%	45,000.00	100.000%	45,000.00	101.314%		45,591.30
06/01/2015	Serial Coupon	2.500%	2.050%	45,000.00	100.000%	45,000.00	101.719%		45,773.55
06/01/2016	Serial Coupon	2.500%	2.250%	50,000.00	100.000%	50,000.00	101.176%		50,588.00
06/01/2017	Serial Coupon	2.500%	2.550%	50,000.00	100.000%	50,000.00	99.723%		49,861.50
06/01/2018	Serial Coupon	2.500%	2.800%	50,000.00	100.000%	50,000.00	98.104%		49,052.00
06/01/2019	Serial Coupon	3.000%	3.000%	50,000.00	100.000%	50,000.00	100.000%		50,000.00
06/01/2020	Serial Coupon	3.000%	3.350%	55,000.00	100.000%	55,000.00	97.299%		53,514.45
06/01/2021	Serial P-CAB	-	4.000%	37,013.35	100.000%	55,000.00	67.297%		37,013.35
06/01/2022	Serial Coupon	3.500%	3.800%	55,000.00	100.000%	55,000.00	97.323%		53,527.65
06/01/2023	Serial Coupon	3.500%	3.950%	55,000.00	100.000%	55,000.00	95.732%		52,652.60
06/01/2024	Serial Coupon	4.000%	4.100%	60,000.00	100.000%	60,000.00	99.000%		59,400.00
06/01/2025	Serial Coupon	4.000%	4.200%	60,000.00	100.000%	60,000.00	97.899%		58,739.40
06/01/2026	Serial Coupon	4.000%	4.300%	65,000.00	100.000%	65,000.00	96.708%		62,860.20
06/01/2027	Serial Coupon	4.500%	4.400%	65,000.00	100.000%	65,000.00	100.802%	c	65,521.30
06/01/2028	Serial Coupon	4.500%	4.500%	70,000.00	100.000%	70,000.00	100.000%		70,000.00
06/01/2029	Serial Coupon	5.000%	4.600%	70,000.00	100.000%	70,000.00	103.177%	c	72,223.90
06/01/2030	Serial Coupon	5.000%	4.700%	75,000.00	100.000%	75,000.00	102.371%	c	76,778.25
06/01/2031	Serial Coupon	5.000%	4.800%	80,000.00	100.000%	80,000.00	101.573%	c	81,258.40
06/01/2036	Term 1 Coupon	5.250%	5.250%	460,000.00	100.000%	460,000.00	100.000%		460,000.00
Total		-	-	**$1,587,013.35**	-	**$1,605,000.00**	-	-	**$1,585,466.45**

Using Call Provision to Lower, or Change, Future Debt Service Payments

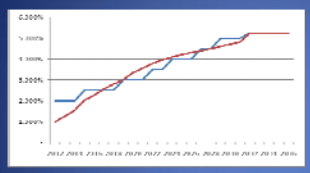
- ***"Current Refunding"*** – Refunding Bonds are issued within 90 days of Call date.
- ***"Rule of Thumb"*** is to refund if present value of savings is at least 3% of principal being refunded.
- ***"Advanced Refunding"*** – Refunding Bonds are issued more than 90-days before Call Date.
  - Refunding Bond proceeds held in an escrow of US Treasury securities until Call Date.
  - IRS allows only one opportunity.
  - Complicated, but used more frequently than Current Refunding.

Rates Have Been Volatile Enough to Provide Refunding Opportunities

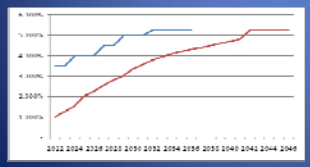
Typically need a 1% drop in rates to meet 3% NPV savings threshold.



Refundings Can Make Sense Even If Rates Do Not Decline – "Moving Down the Curve"



Coupon Interest Rates at Original Issuance
vs.
Market "Yield Curve"



10 Years in Future, Remaining Coupon Rates
vs.
Unchanged Market "Yield Curve"

Bond Structures

Summary

- *Yield To Maturity (Call Date) is the most important consideration for the issuer.*
- *Minimize the use of Term Bonds, if practical to do so.*
- *Include optional redemption (Call) provision unless the extra yield required is high.*
- *Try to keep callable maturities as close to par as practically possible.*

Using Short-Term Notes As Part of Your Financing Strategy

"Utilization of Notes Within Your Debt Structure"

- A Note is issued with a maturity of one year or less.
- When the Note matures, it must be paid off, refunded with a new note or refunded with Bonds.
- Each Note rollover is subject to then current interest rates.
- Historically, Note rates are about 3% lower than Bond rates.
- In 2008 and 2009 some note issuers were not able to re-access the note markets.

Issuers Use Notes To

- Allows the accumulation of small projects into a more efficient bond issue size.
- Helps to match the timing of debt payments with tax collections (February or May elections for school districts).
- Can increase investment earnings in construction and/or bond retirement funds.
- Gives the issuer more time to prepare the disclosure documents (Official Statement) required for bond issues.
- Provides flexibility in principal repayment.

Structuring Strategies

Pros

1. Ease of issuance
2. Lower rates due to short-term nature
3. Provides flexibility

Cons

1. Increased costs of issuance over time
2. Interest rate risk
3. Market access for lower rated credits (ex. Fall of 2008)

Questions & Answers

Thank You for Your Attendance

Slide 4: Issue With Serial Bonds & a Term Bond; With 6/1/2021 Call Date

Maturity	Type of Bond	Coupon	Yield	Maturity Value	Price		Dollar Price
06/01/2012	Serial Coupon	2.000%	1.000%	45,000.00	100.992%		45,446.40
06/01/2013	Serial Coupon	2.000%	1.250%	45,000.00	101.476%		45,664.20
06/01/2014	Serial Coupon	2.000%	1.550%	45,000.00	101.314%		45,591.30
06/01/2015	Serial Coupon	2.500%	2.050%	45,000.00	101.719%		45,773.55
06/01/2016	Serial Coupon	2.500%	2.250%	45,000.00	101.176%		45,529.20
06/01/2017	Serial Coupon	2.500%	2.550%	50,000.00	99.723%		49,861.50
06/01/2018	Serial Coupon	2.500%	2.800%	50,000.00	98.104%		49,052.00
06/01/2019	Serial Coupon	3.000%	3.000%	50,000.00	100.000%		50,000.00
06/01/2020	Serial Coupon	3.000%	3.350%	50,000.00	97.299%		48,649.50
06/01/2021	Serial Coupon	3.000%	3.550%	55,000.00	95.404%		52,472.20
06/01/2022	Serial Coupon	3.500%	3.800%	55,000.00	97.323%		53,527.65
06/01/2023	Serial Coupon	3.500%	3.950%	55,000.00	95.732%		52,652.60
06/01/2024	Serial Coupon	4.000%	4.100%	60,000.00	99.000%		59,400.00
06/01/2025	Serial Coupon	4.000%	4.200%	60,000.00	97.899%		58,739.40
06/01/2026	Serial Coupon	4.000%	4.300%	65,000.00	96.708%		62,860.20
06/01/2027	Serial Coupon	4.500%	4.400%	65,000.00	100.802%	c	65,521.30
06/01/2028	Serial Coupon	4.500%	4.500%	70,000.00	100.000%		70,000.00
06/01/2029	Serial Coupon	5.000%	4.600%	70,000.00	103.177%	c	72,223.90
06/01/2030	Serial Coupon	5.000%	4.700%	75,000.00	102.371%	c	76,778.25
06/01/2031	Serial Coupon	5.000%	4.800%	80,000.00	101.573%	c	81,258.40
06/01/2036	Term 1 Coupon	5.250%	5.250%	455,000.00	100.000%		455,000.00
Total	**-**	**-**	**-**	**$1,590,000.00**	**-**	**-**	**$1,586,001.55**

06/01/2032	85,000.00	5.250%
06/01/2033	85,000.00	5.250%
06/01/2034	90,000.00	5.250%
06/01/2035	95,000.00	5.250%
06/01/2036	100,000.00	5.250%

Slide 5: "Coupon" Rate Is the Interest Paid Each Year (One-Half Semi-Annually)

Maturity	Type of Bond	Coupon	Yield	Issuance Value	Par	Maturity Value	Price		Dollar Price
06/01/2012	Serial Coupon	2.000%	1.000%	45,000.00	100.000%	45,000.00	100.992%		45,446.40
06/01/2013	Serial Coupon	2.000%	1.250%	45,000.00	100.000%	45,000.00	101.476%		45,664.20
06/01/2014	Serial Coupon	2.000%	1.550%	45,000.00	100.000%	45,000.00	101.314%		45,591.30
06/01/2015	Serial Coupon	2.500%	2.050%	45,000.00	100.000%	45,000.00	101.719%		45,773.55
06/01/2016	Serial Coupon	2.500%	2.250%	50,000.00	100.000%	50,000.00	101.176%		50,588.00
06/01/2017	Serial Coupon	2.500%	2.550%	50,000.00	100.000%	50,000.00	99.723%		49,861.50
06/01/2018	Serial Coupon	2.500%	2.800%	50,000.00	100.000%	50,000.00	98.104%		49,052.00
06/01/2019	Serial Coupon	3.000%	3.000%	50,000.00	100.000%	50,000.00	100.000%		50,000.00
06/01/2020	Serial Coupon	3.000%	3.350%	55,000.00	100.000%	55,000.00	97.299%		53,514.45
06/01/2021	Serial P-CAB	-	4.000%	37,013.35	100.000%	55,000.00	67.297%		37,013.35
06/01/2022	Serial Coupon	3.500%	3.800%	55,000.00	100.000%	55,000.00	97.323%		53,527.65
06/01/2023	Serial Coupon	3.500%	3.950%	55,000.00	100.000%	55,000.00	95.732%		52,652.60
06/01/2024	Serial Coupon	4.000%	4.100%	60,000.00	100.000%	60,000.00	99.000%		59,400.00
06/01/2025	Serial Coupon	4.000%	4.200%	60,000.00	100.000%	60,000.00	97.899%		58,739.40
06/01/2026	Serial Coupon	4.000%	4.300%	65,000.00	100.000%	65,000.00	96.708%		62,860.20
06/01/2027	Serial Coupon	4.500%	4.400%	65,000.00	100.000%	65,000.00	100.802%	c	65,521.30
06/01/2028	Serial Coupon	4.500%	4.500%	70,000.00	100.000%	70,000.00	100.000%		70,000.00
06/01/2029	Serial Coupon	5.000%	4.600%	70,000.00	100.000%	70,000.00	103.177%	c	72,223.90
06/01/2030	Serial Coupon	5.000%	4.700%	75,000.00	100.000%	75,000.00	102.371%	c	76,778.25
06/01/2031	Serial Coupon	5.000%	4.800%	80,000.00	100.000%	80,000.00	101.573%	c	81,258.40
06/01/2036	Term 1 Coupon	5.250%	5.250%	460,000.00	100.000%	460,000.00	100.000%		460,000.00
Total		-	-	-	**$1,587,013.35**	-	**$1,605,000.00**	-	- **$1,585,466.45**

Slide 6: Capital Appreciation Bond (CAB), No Semi-Annual Interest Payment

Maturity	Type of Bond	Coupon	Yield	Issuance Value	Par	Maturity Value	Price		Dollar Price
06/01/2012	Serial Coupon	2.000%	1.000%	45,000.00	100.000%	45,000.00	100.992%		45,446.40
06/01/2013	Serial Coupon	2.000%	1.250%	45,000.00	100.000%	45,000.00	101.476%		45,664.20
06/01/2014	Serial Coupon	2.000%	1.550%	45,000.00	100.000%	45,000.00	101.314%		45,591.30
06/01/2015	Serial Coupon	2.500%	2.050%	45,000.00	100.000%	45,000.00	101.719%		45,773.55
06/01/2016	Serial Coupon	2.500%	2.250%	50,000.00	100.000%	50,000.00	101.176%		50,588.00
06/01/2017	Serial Coupon	2.500%	2.550%	50,000.00	100.000%	50,000.00	99.723%		49,861.50
06/01/2018	Serial Coupon	2.500%	2.800%	50,000.00	100.000%	50,000.00	98.104%		49,052.00
06/01/2019	Serial Coupon	3.000%	3.000%	50,000.00	100.000%	50,000.00	100.000%		50,000.00
06/01/2020	Serial Coupon	3.000%	3.350%	55,000.00	100.000%	55,000.00	97.299%		53,514.45
06/01/2021	Serial P-CAB	-	4.000%	37,013.35	100.000%	55,000.00	67.297%		37,013.35
06/01/2022	Serial Coupon	3.500%	3.800%	55,000.00	100.000%	55,000.00	97.323%		53,527.65
06/01/2023	Serial Coupon	3.500%	3.950%	55,000.00	100.000%	55,000.00	95.732%		52,652.60
06/01/2024	Serial Coupon	4.000%	4.100%	60,000.00	100.000%	60,000.00	99.000%		59,400.00
06/01/2025	Serial Coupon	4.000%	4.200%	60,000.00	100.000%	60,000.00	97.899%		58,739.40
06/01/2026	Serial Coupon	4.000%	4.300%	65,000.00	100.000%	65,000.00	96.708%		62,860.20
06/01/2027	Serial Coupon	4.500%	4.400%	65,000.00	100.000%	65,000.00	100.802%	c	65,521.30
06/01/2028	Serial Coupon	4.500%	4.500%	70,000.00	100.000%	70,000.00	100.000%		70,000.00
06/01/2029	Serial Coupon	5.000%	4.600%	70,000.00	100.000%	70,000.00	103.177%	c	72,223.90
06/01/2030	Serial Coupon	5.000%	4.700%	75,000.00	100.000%	75,000.00	102.371%	c	76,778.25
06/01/2031	Serial Coupon	5.000%	4.800%	80,000.00	100.000%	80,000.00	101.573%	c	81,258.40
06/01/2036	Term 1 Coupon	5.250%	5.250%	460,000.00	100.000%	460,000.00	100.000%		460,000.00
Total		-	-	-	**$1,587,013.35**	-	**$1,605,000.00**	-	- **$1,585,466.45**

Slide 8: "Yield" Is the Net Cost to the Issuer (Return to the investor) aka "Yield to Maturity" or "Yield To Call"

Maturity	Type of Bond	Coupon	Yield	Issuance Value	Par	Maturity Value	Price		Dollar Price
06/01/2012	Serial Coupon	2.000%	1.000%	45,000.00	100.000%	45,000.00	100.992%		45,446.40
06/01/2013	Serial Coupon	2.000%	1.250%	45,000.00	100.000%	45,000.00	101.476%		45,664.20
06/01/2014	Serial Coupon	2.000%	1.550%	45,000.00	100.000%	45,000.00	101.314%		45,591.30
06/01/2015	Serial Coupon	2.500%	2.050%	45,000.00	100.000%	45,000.00	101.719%		45,773.55
06/01/2016	Serial Coupon	2.500%	2.250%	50,000.00	100.000%	50,000.00	101.176%		50,588.00
06/01/2017	Serial Coupon	2.500%	2.550%	50,000.00	100.000%	50,000.00	99.723%		49,861.50
06/01/2018	Serial Coupon	2.500%	2.800%	50,000.00	100.000%	50,000.00	98.104%		49,052.00
06/01/2019	Serial Coupon	3.000%	3.000%	50,000.00	100.000%	50,000.00	100.000%		50,000.00
06/01/2020	Serial Coupon	3.000%	3.350%	55,000.00	100.000%	55,000.00	97.299%		53,514.45
06/01/2021	Serial P-CAB	-	4.000%	37,013.35	100.000%	55,000.00	67.297%		37,013.35
06/01/2022	Serial Coupon	3.500%	3.800%	55,000.00	100.000%	55,000.00	97.323%		53,527.65
06/01/2023	Serial Coupon	3.500%	3.950%	55,000.00	100.000%	55,000.00	95.732%		52,652.60
06/01/2024	Serial Coupon	4.000%	4.100%	60,000.00	100.000%	60,000.00	99.000%		59,400.00
06/01/2025	Serial Coupon	4.000%	4.200%	60,000.00	100.000%	60,000.00	97.899%		58,739.40
06/01/2026	Serial Coupon	4.000%	4.300%	65,000.00	100.000%	65,000.00	96.708%		62,860.20
06/01/2027	Serial Coupon	4.500%	4.400%	65,000.00	100.000%	65,000.00	100.802%	c	65,521.30
06/01/2028	Serial Coupon	4.500%	4.500%	70,000.00	100.000%	70,000.00	100.000%		70,000.00
06/01/2029	Serial Coupon	5.000%	4.600%	70,000.00	100.000%	70,000.00	103.177%	c	72,223.90
06/01/2030	Serial Coupon	5.000%	4.700%	75,000.00	100.000%	75,000.00	102.371%	c	76,778.25
06/01/2031	Serial Coupon	5.000%	4.800%	80,000.00	100.000%	80,000.00	101.573%	c	81,258.40
06/01/2036	Term 1 Coupon	5.250%	5.250%	460,000.00	100.000%	460,000.00	100.000%		460,000.00
Total	-	-	-	**$1,587,013.35**	-	**$1,605,000.00**	-	-	**$1,585,466.45**

Slide 9: "True Interest Cost" (TIC) Is the Time Value Average of the Yields Required of the Issuer

Maturity	Type of Bond	Coupon	Yield	Maturity Value	Price		Dollar Price
06/01/2012	Serial Coupon	2.000%	1.000%	45,000.00	100.992%		45,446.40
06/01/2013	Serial Coupon	2.000%	1.250%	45,000.00	101.476%		45,664.20
06/01/2014	Serial Coupon	2.000%	1.550%	45,000.00	101.314%		45,591.30
06/01/2015	Serial Coupon	2.500%	2.050%	45,000.00	101.719%		45,773.55
06/01/2016	Serial Coupon	2.500%	2.250%	45,000.00	101.176%		45,529.20
06/01/2017	Serial Coupon	2.500%	2.550%	50,000.00	99.723%		49,861.50
06/01/2018	Serial Coupon	2.500%	2.800%	50,000.00	98.104%		49,052.00
06/01/2019	Serial Coupon	3.000%	3.000%	50,000.00	100.000%		50,000.00
06/01/2020	Serial Coupon	3.000%	3.350%	50,000.00	97.299%		48,649.50
06/01/2021	Serial Coupon	3.000%	3.550%	55,000.00	95.404%		52,472.20
06/01/2022	Serial Coupon	3.500%	3.800%	55,000.00	97.323%		53,527.65
06/01/2023	Serial Coupon	3.500%	3.950%	55,000.00	95.732%		52,652.60
06/01/2024	Serial Coupon	4.000%	4.100%	60,000.00	99.000%		59,400.00
06/01/2025	Serial Coupon	4.000%	4.200%	60,000.00	97.899%		58,739.40
06/01/2026	Serial Coupon	4.000%	4.300%	65,000.00	96.708%		62,860.20
06/01/2027	Serial Coupon	4.500%	4.400%	65,000.00	100.802%	c	65,521.30
06/01/2028	Serial Coupon	4.500%	4.500%	70,000.00	100.000%		70,000.00
06/01/2029	Serial Coupon	5.000%	4.600%	70,000.00	103.177%	c	72,223.90
06/01/2030	Serial Coupon	5.000%	4.700%	75,000.00	102.371%	c	76,778.25
06/01/2031	Serial Coupon	5.000%	4.800%	80,000.00	101.573%	c	81,258.40
06/01/2036	Term 1 Coupon	5.250%	5.250%	455,000.00	100.000%		455,000.00
Total	**-**	**-**	**-**	**$1,590,000.00**	**-**	**-**	**$1,586,001.55**
Average Life							14.846 Years
Average Coupon							4.6090341%
Net Interest Cost (NIC)							4.7107009%
True Interest Cost (TIC)							4.6586746%

Slide 10: Calculation of Premium

06/01/2013	Serial Coupon	2.000%	1.250%	45,000.00	101.476%	45,664.20

Slide 11: Price Is Calculated Differently If Sold At a Premium & Callable ; Yield To Call not Yield To Maturity

Maturity	Type of Bond	Coupon	Yield	Issuance Value	Par	Maturity Value	Price		Dollar Price
06/01/2012	Serial Coupon	2.000%	1.000%	45,000.00	100.000%	45,000.00	100.992%		45,446.40
06/01/2013	Serial Coupon	2.000%	1.250%	45,000.00	100.000%	45,000.00	101.476%		45,664.20
06/01/2014	Serial Coupon	2.000%	1.550%	45,000.00	100.000%	45,000.00	101.314%		45,591.30
06/01/2015	Serial Coupon	2.500%	2.050%	45,000.00	100.000%	45,000.00	101.719%		45,773.55
06/01/2016	Serial Coupon	2.500%	2.250%	50,000.00	100.000%	50,000.00	101.176%		50,588.00
06/01/2017	Serial Coupon	2.500%	2.550%	50,000.00	100.000%	50,000.00	99.723%		49,861.50
06/01/2018	Serial Coupon	2.500%	2.800%	50,000.00	100.000%	50,000.00	98.104%		49,052.00
06/01/2019	Serial Coupon	3.000%	3.000%	50,000.00	100.000%	50,000.00	100.000%		50,000.00
06/01/2020	Serial Coupon	3.000%	3.350%	55,000.00	100.000%	55,000.00	97.299%		53,514.45
06/01/2021	Serial P-CAB	-	4.000%	37,013.35	100.000%	55,000.00	67.297%		37,013.35
06/01/2022	Serial Coupon	3.500%	3.800%	55,000.00	100.000%	55,000.00	97.323%		53,527.65
06/01/2023	Serial Coupon	3.500%	3.950%	55,000.00	100.000%	55,000.00	95.732%		52,652.60
06/01/2024	Serial Coupon	4.000%	4.100%	60,000.00	100.000%	60,000.00	99.000%		59,400.00
06/01/2025	Serial Coupon	4.000%	4.200%	60,000.00	100.000%	60,000.00	97.899%		58,739.40
06/01/2026	Serial Coupon	4.000%	4.300%	65,000.00	100.000%	65,000.00	96.708%		62,860.20
06/01/2027	Serial Coupon	4.500%	4.400%	65,000.00	100.000%	65,000.00	100.802%	c	65,521.30
06/01/2028	Serial Coupon	4.500%	4.500%	70,000.00	100.000%	70,000.00	100.000%		70,000.00
06/01/2029	Serial Coupon	5.000%	4.600%	70,000.00	100.000%	70,000.00	103.177%	c	72,223.90
06/01/2030	Serial Coupon	5.000%	4.700%	75,000.00	100.000%	75,000.00	102.371%	c	76,778.25
06/01/2031	Serial Coupon	5.000%	4.800%	80,000.00	100.000%	80,000.00	101.573%	c	81,258.40
06/01/2036	Term 1 Coupon	5.250%	5.250%	460,000.00	100.000%	460,000.00	100.000%		460,000.00
Total		-	-	- **$1,587,013.35**	-	**$1,605,000.00**	-	-	**$1,585,466.45**

Maturity Date	6/01/2031
Price to Maturity	102.5530000%
Price to Call (6/01/2021)	101.5730000%
Lowest Price	101.5730000%
First Available Call Date	6/01/2021
Years to First Call	10.000 Years
Yield to Maturity	4.8759805%
Yield to Call	4.8000000%

Slide 12: Price Sold To Investors At Issuance

Maturity	Type of Bond	Coupon	Yield	Issuance Value	Par	Maturity Value	Price		Dollar Price
06/01/2012	Serial Coupon	2.000%	1.000%	45,000.00	100.000%	45,000.00	100.992%		45,446.40
06/01/2013	Serial Coupon	2.000%	1.250%	45,000.00	100.000%	45,000.00	101.476%		45,664.20
06/01/2014	Serial Coupon	2.000%	1.550%	45,000.00	100.000%	45,000.00	101.314%		45,591.30
06/01/2015	Serial Coupon	2.500%	2.050%	45,000.00	100.000%	45,000.00	101.719%		45,773.55
06/01/2016	Serial Coupon	2.500%	2.250%	50,000.00	100.000%	50,000.00	101.176%		50,588.00
06/01/2017	Serial Coupon	2.500%	2.550%	50,000.00	100.000%	50,000.00	99.723%		49,861.50
06/01/2018	Serial Coupon	2.500%	2.800%	50,000.00	100.000%	50,000.00	98.104%		49,052.00
06/01/2019	Serial Coupon	3.000%	3.000%	50,000.00	100.000%	50,000.00	100.000%		50,000.00
06/01/2020	Serial Coupon	3.000%	3.350%	55,000.00	100.000%	55,000.00	97.299%		53,514.45
06/01/2021	Serial P-CAB	-	4.000%	37,013.35	100.000%	55,000.00	67.297%		37,013.35
06/01/2022	Serial Coupon	3.500%	3.800%	55,000.00	100.000%	55,000.00	97.323%		53,527.65
06/01/2023	Serial Coupon	3.500%	3.950%	55,000.00	100.000%	55,000.00	95.732%		52,652.60
06/01/2024	Serial Coupon	4.000%	4.100%	60,000.00	100.000%	60,000.00	99.000%		59,400.00
06/01/2025	Serial Coupon	4.000%	4.200%	60,000.00	100.000%	60,000.00	97.899%		58,739.40
06/01/2026	Serial Coupon	4.000%	4.300%	65,000.00	100.000%	65,000.00	96.708%		62,860.20
06/01/2027	Serial Coupon	4.500%	4.400%	65,000.00	100.000%	65,000.00	100.802%	c	65,521.30
06/01/2028	Serial Coupon	4.500%	4.500%	70,000.00	100.000%	70,000.00	100.000%		70,000.00
06/01/2029	Serial Coupon	5.000%	4.600%	70,000.00	100.000%	70,000.00	103.177%	c	72,223.90
06/01/2030	Serial Coupon	5.000%	4.700%	75,000.00	100.000%	75,000.00	102.371%	c	76,778.25
06/01/2031	Serial Coupon	5.000%	4.800%	80,000.00	100.000%	80,000.00	101.573%	c	81,258.40
06/01/2036	Term 1 Coupon	5.250%	5.250%	460,000.00	100.000%	460,000.00	100.000%		460,000.00
Total		-	-	- **$1,587,013.35**	-	**$1,605,000.00**	-	-	**$1,585,466.45**

Slide 13: Net Result to Issuer

Sources Of Funds	
Par Amount of Bonds	$1,590,000.00
Total Sources	**$1,590,000.00**
Uses Of Funds	
Original Issue Discount (OID)	3,998.45
Total Underwriter's Discount (1.258%)	20,000.00
Costs of Issuance	45,000.00
Gross Bond Insurance Premium (65.0 bp)	17,406.76
Deposit to Project Construction Fund	1,500,000.00
Rounding Amount	3,594.79
Total Uses	**$1,590,000.00**

Slide 15: $1,115,000 of Total Is Callable After 6/1/2021 Call Date

Maturity	Type of Bond	Coupon	Yield	Issuance Value	Par	Maturity Value	Price		Dollar Price
06/01/2012	Serial Coupon	2.000%	1.000%	45,000.00	100.000%	45,000.00	100.992%		45,446.40
06/01/2013	Serial Coupon	2.000%	1.250%	45,000.00	100.000%	45,000.00	101.476%		45,664.20
06/01/2014	Serial Coupon	2.000%	1.550%	45,000.00	100.000%	45,000.00	101.314%		45,591.30
06/01/2015	Serial Coupon	2.500%	2.050%	45,000.00	100.000%	45,000.00	101.719%		45,773.55
06/01/2016	Serial Coupon	2.500%	2.250%	50,000.00	100.000%	50,000.00	101.176%		50,588.00
06/01/2017	Serial Coupon	2.500%	2.550%	50,000.00	100.000%	50,000.00	99.723%		49,861.50
06/01/2018	Serial Coupon	2.500%	2.800%	50,000.00	100.000%	50,000.00	98.104%		49,052.00
06/01/2019	Serial Coupon	3.000%	3.000%	50,000.00	100.000%	50,000.00	100.000%		50,000.00
06/01/2020	Serial Coupon	3.000%	3.350%	55,000.00	100.000%	55,000.00	97.299%		53,514.45
06/01/2021	Serial P-CAB	-	4.000%	37,013.35	100.000%	55,000.00	67.297%		37,013.35
06/01/2022	Serial Coupon	3.500%	3.800%	55,000.00	100.000%	55,000.00	97.323%		53,527.65
06/01/2023	Serial Coupon	3.500%	3.950%	55,000.00	100.000%	55,000.00	95.732%		52,652.60
06/01/2024	Serial Coupon	4.000%	4.100%	60,000.00	100.000%	60,000.00	99.000%		59,400.00
06/01/2025	Serial Coupon	4.000%	4.200%	60,000.00	100.000%	60,000.00	97.899%		58,739.40
06/01/2026	Serial Coupon	4.000%	4.300%	65,000.00	100.000%	65,000.00	96.708%		62,860.20
06/01/2027	Serial Coupon	4.500%	4.400%	65,000.00	100.000%	65,000.00	100.802%	c	65,521.30
06/01/2028	Serial Coupon	4.500%	4.500%	70,000.00	100.000%	70,000.00	100.000%		70,000.00
06/01/2029	Serial Coupon	5.000%	4.600%	70,000.00	100.000%	70,000.00	103.177%	c	72,223.90
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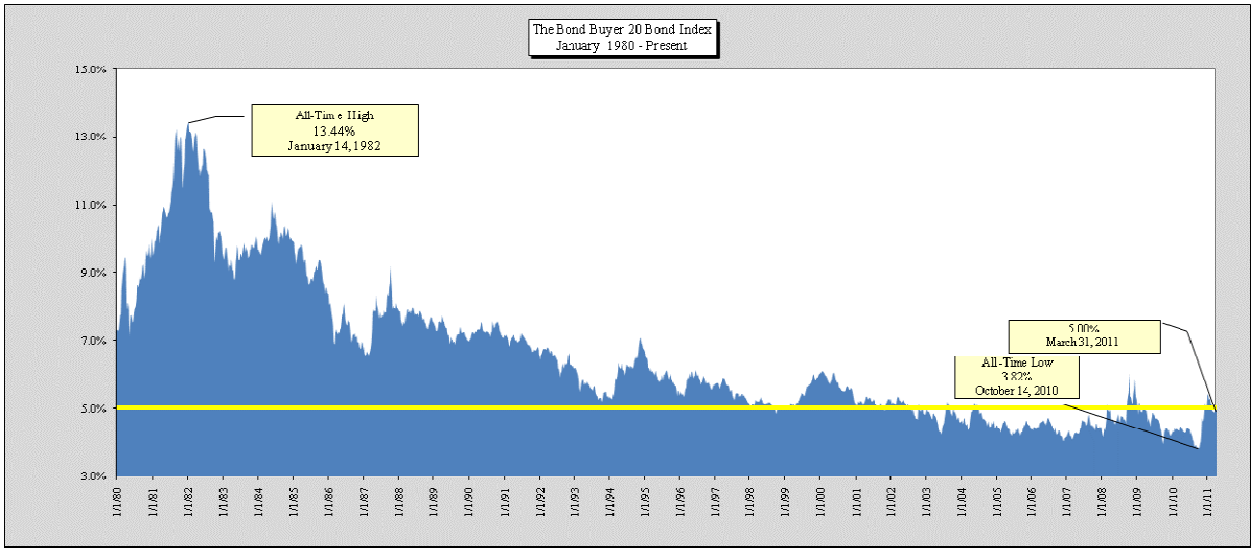
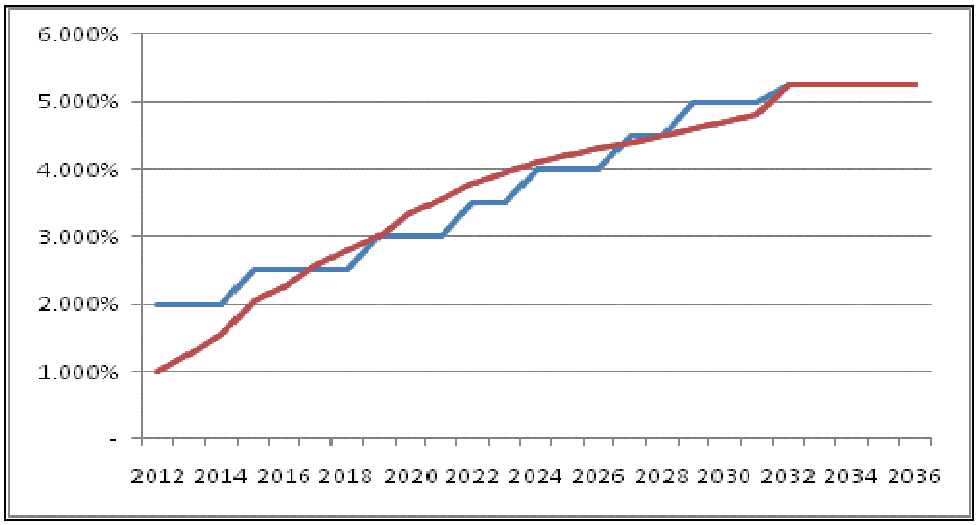
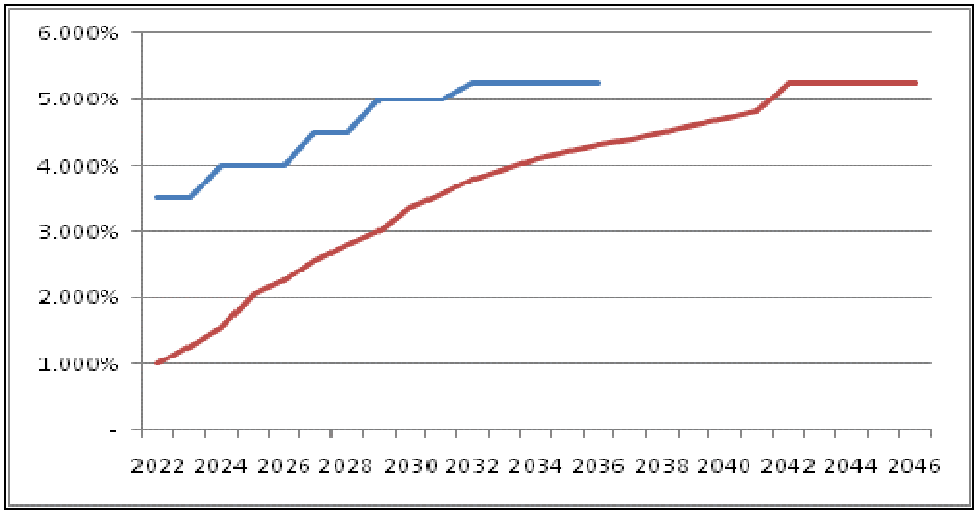
06/01/2031	Serial Coupon	5.000%	4.800%	80,000.00	100.000%	80,000.00	101.573%	c	81,258.40
06/01/2036	Term 1 Coupon	5.250%	5.250%	460,000.00	100.000%	460,000.00	100.000%		460,000.00
Total		**-**	**-**	**-** **$1,587,013.35**	**-**	**$1,605,000.00**	**-**	**-**	**$1,585,466.45**

Slide 17: Rates Have Been Volatile Enough to Provide Refunding Opportunities



Slide 18: Refundings Can Make Sense Even If Rates Do Not Decline – "Moving Down the Curve"