



Office of the City Manager

INFORMATION CALENDAR

June 25, 2019

To: Honorable Mayor and Members of the City Council

From: Dee Williams-Ridley, City Manager

Submitted by: Henry Oyekanmi, Director, Finance

Subject: Referral Response: Community Microbond Initiative

SUMMARY

The City Council directed City staff to research the feasibility of a microbond financing structure to fund identified capital projects in a way that engages local investment participation. Historically, the City's bonds have been purchased by national public finance investment banks who then resell them to their institutional and retail clients.

City staff, working with the City's municipal advisor (NHA Advisors, LLC), researched historical use of microbonds, considerations, options and decision-points related to the implementation of a financing program. A number of critical decision points will need to be answered prior to any implementation of a microbond financing program.

CURRENT SITUATION AND ITS EFFECTS

This report responds to referral #2018-4 that originally appeared on the agenda of the May 1, 2018 Council meeting and was sponsored by Councilmember Ben Bartlett.

BACKGROUND

In the last few years, the use of minibonds¹ has increased as issuers look to raise funds for capital projects while tapping local investors who are interested in investing but are typically restricted given the \$5,000 minimum denomination of a traditionally-structured municipal bond. Minibonds are sold in increments significantly less than \$5,000 with the most popular increments being \$1,000 and \$500. "Microbond" refers to bond denominations of \$100 or less, but there is no common industry standard for use of that term and some issuers elect to use the term minibond to refer to bonds denominated in increments as low as \$25.

Minibonds are often sold directly by the municipal entity to individual investors. Early examples of this direct sale required mailed-in or hand-delivered orders of physical certificates, but more recent minibond sales have utilized the internet or other proprietary networks to facilitate the order process. In a direct sale scenario (no underwriting by an investment bank) there is very limited secondary markets for the bonds and the owners

¹The term minibond throughout this report refers only to municipal bonds issued in increments smaller than \$5,000.

are often required to own the minibonds for their entire maturity. Depending on the structure of the minibond, there will be physical certificates or a registry that tracks ownership of each bond. This differs from a traditional public offering that utilizes an underwriter to serve as the intermediary market maker and a trustee/paying agent who manages the registry of bond owners for the term of the financing (as well as facilitating the principal and interest payments).

Minibonds have been used for several decades by municipal issuers to access a broader group of potential investors and avoid the fees associated with a standard bond issuance. In 1990, the City of Mission Viejo, California issued minibonds with denominations of \$500 to finance a portion of the city hall renovations. While Mission Viejo's objective was to raise \$500,000, the minibond issuance only raised \$140,500. The minibond issuance had 35 orders, with orders ranging from \$500 to \$30,000. The city ended up supplementing the financing with traditional municipal bonds sold through a public offering.

In 1991, the City of Anaheim, issued \$3.4 million in minibonds. These were issued as zero-coupon bonds (meaning that the bonds were purchased at a discount and bond owners were paid the face value of the bonds at maturity). Unlike many other minibonds, these were not issued as part of a larger financing.

In 1992, the City of New York issued \$100 million in minibonds as part of a larger, \$950 million financing. Those minibonds were sold as zero-coupon bonds, denominated in \$5,000 increments. The "traditional" bonds issued after the minibond offering were sold in \$25,000 denominations. The city worked with their underwriter to set up a toll-free number for investors to call for information and place verbal orders. During that financing, the phone line received over 28,000 calls and generated verbal commitments of over \$68 million. The average order was for \$6,600 and 62% of purchasers polled indicated that they bought the zero-coupon bonds to pay for future education or retirement. That minibond issuance program was so successful that the city offered a similar minibond program again in October of that same year.

From 2001 through 2006, Los Angeles Department of Water and Power ("LADWP") issued four series of minibonds sold to current and former employees. Each series comprised of a current interest bond, denominated in \$100 increments, and a capital appreciation bond, denominated in \$25 increments. The current interest bonds had maturities of 3, 5, and 10 years while the capital appreciation bonds were sold with a 15-year maturity. Over the course of 5 years, LADWP issued a total of \$34,110,450 in minibonds that were purchased by a total of 2,558 retired and active employees. These non-callable bonds were bearer bonds – the owner directly purchased the bonds from LADWP and was required to safeguard the certificate to ensure payment. In addition, these bonds were non-transferrable and had no secondary market but could be redeemed for cash at any time after an initial 90-day period.

In December 2008, Bergen County, New Jersey, issued \$610,000 in zero-coupon minibonds to finance improvements to its parks system. This minibond issuance was part of a larger, \$69 million competitively sold bond offering. In 2009 and 2010, the State of Minnesota sold bonds in \$1,000 denominations. And in 2011 the State of Massachusetts sold \$5 million of minibonds in \$1,000 denominations as part of a larger \$490 million financing.

In 2011, the California governor signed a bill authorizing the reduction of the minimum face value denomination on State of California general obligation bonds from \$1,000 to \$25. The decision to sell state general obligation bonds in increments as low as \$25 will be made on a case by case basis (it appears that the state has yet to exercise this option).

In 2014, the City of Denver issued a \$12 million minibond denominated in \$500 increments as part of a larger, \$550 million financing. Denver sold their minibonds directly to Colorado residents and made headlines for selling out in a short window. Since 2015, there have been minibond issuances for the cities of Vancouver (Washington), Burlington (Vermont), Lawrence (Kansas), Cambridge (Massachusetts), Madison (Wisconsin), and Somerville (Massachusetts). These minibond issuances are detailed in a table in the subsequent section. One unifying feature of the mini bond issuances in Burlington, Lawrence, Cambridge, Madison, and Somerville is that each of these cities is home to a major university or college. One driving consideration for issuing minibonds is community engagement and, as one of the financing participants on these minibond issuances said, "Communities that are innovative and engaged are usually college towns. They are the ones with the most participation."

Characteristics of Recent Minibond Sales

Recent minibond sales have continued to use the strategy of selling minibonds as part of a larger financing strategy. The minibond series of the financing is often sold prior to offering the larger, traditionally- structured series and the minibond series is contingent upon the successful sale of the larger, second series (i.e. the minibonds are not issued if the second series bonds are not issued). One noted benefit of issuing minibonds as a first series in a larger financing is that any shortfall in funding raised through the minibond issuance can be remedied by increasing the amount sold in the second financing through a public offering sale process to the general public.

In selecting a project to finance through minibonds, issuers tend to focus on smaller, defined projects that have tangible connection to the local investor base. The objective is to maximize local investor participation in the minibond offering by selecting an easily identifiable project that the community has expressed interest in or would directly benefit from.

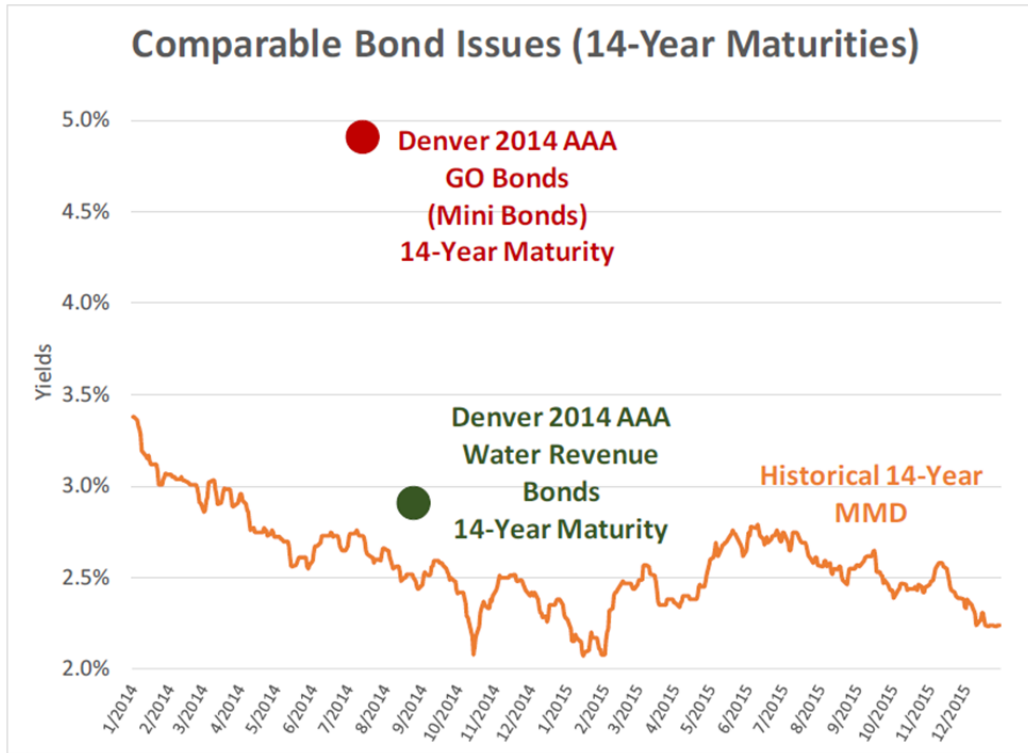
Recent minibonds have been sold through two primary channels – either issued directly from the municipal authority or issued electronically through an underwriter's retail distribution network. Because of the complexity of developing an online ordering system,

issuing directly from the municipal authority typically requires mailed-in or physical orders, physical transfer of the bond certificates, and bond owners to submit the certificates to the municipal authority to receive payment. The minibonds of the early 1990's and the 2015 Vancouver, Washington, minibonds (detailed in the table below) were sold through this method.

If the City is willing to develop an online platform to issue minibonds directly, they can facilitate the bond sale through the internet. The 2014 Denver minibonds which made news headlines for selling \$12 million in 20 minutes were issued directly from the city and orders could be delivered online, mail, and hand delivery. Denver offered the bonds for sale online two hours before they began accepting mailed-in or hand delivered orders, and as a result, some residents expressed frustration that the bonds sold out before any physical orders were processed. Also, though orders for the Denver minibonds could be placed online, the orders were not automatically processed, and city staff time was required to process each order. As a result, the city had 375 extra online orders before the sale of the minibonds closed.

It is worth noting that the City of Denver's widely-publicized success at issuing the 2014 minibonds may be a combination of several factors. First, the city had issued minibonds four times prior to the 2014 minibond issuance, with the most recent being issued in 2007, and had a track record and developed an investor base for the minibonds. Finally, research indicates that the City of Denver's 2014 minibonds were issued at yields significantly above market rates at that time. The 9-year maturities were issued at 4.38% and 14-year maturities were issued at 4.89%. By comparison a month later the City of Denver issued water revenue bonds (with the same "AAA" rating as the city's general obligation minibonds) which were sold to institutional investors using typical underwriting, legal, and advisory services. These water revenue bonds priced with a yield on the 9-year maturity less than 2.5% and the yield on the 14-year maturity less than 3%.

The graphic below highlights the difference in yield on the 14-year maturities between the 2014 Minibonds, the 2014 Water Revenue bonds, and the 14-year MMD.



The second, newer channel for issuing minibonds is through an underwriter’s retail investor distribution network. This process mitigates the requirement for City staff to process orders or oversee the sale process. To maximize local investor participation, the underwriter can assist the issuer with the marketing process through print and digital campaigns. There is also potential for an underwriter’s involvement and records mitigating the administrative workload of maintaining the list of bond owners and facilitating transfer of the bonds between bond owners. However, we note that this role of maintaining a book of bond owners has been traditionally filled by DTC Corporation on bond issuances (typically paid as a component of the underwriter’s discount).

The following table highlights some of the recent minibonds sold and key characteristics of those issuances:

Details on Recent Minibond Issuances							
Year	Issuer	Minibond Financed Project	Minibond Par	Minibond Denomination	Amount Financed (All Bonds)	Issuer Rating	Sale Period
2018	Somerville MA	Multiple Projects	\$500,000	\$1,000	\$11.3 million	AA+/Aa1	7 Days
2018	Madison WI	Botanical Gardens	\$876,000 ²	\$500	\$100 million	Aaa	6 Days
2018	Cambridge MA	Not Available	\$2,000,000	\$1,000	\$84.5 million	AAA/Aaa	6 Days
2017	Lawrence KS	Fire Truck	\$654,000	\$1,000	\$21.9 million	Aa1	4 Days
2017	Burlington VT	Sidewalks, Streets, Waterfront Access	\$5,144,000 ³	\$1,000	\$5.14 million	A3	1 Day
2015	Vancouver WA	Barracks Renovation	\$1,296,500 ⁴	\$500	\$24.4 million	AA/Aa3	10 Days
2014	Denver CO	City cultural facilities	\$12,000,000	\$500	\$550 million	AAA/Aaa	1 Day

Secondary Market Liquidity Considerations

The structure of the minibond will determine what kind of secondary market there is available to bond owners. If the City directly sells the bonds to local investors (i.e. without using an underwriter or placement agent), the City will most likely sell the minibond as bearer bonds or create a registry to manage ownership over the term of the outstanding bonds. If the registry concept is utilized, the City could preclude original bondholders from selling their minibonds to others to avoid the administrative difficulty of tracking the appropriate ownership. If the City elects to provide liquidity, a more comprehensive tracking process will be required.

If the City sells the minibonds directly to the public as bearer bonds, a bond owner will be required to physically present their bond certificate to the City to receive interest and principal payments (historically called “clipping coupons”). These bonds will be transferrable from one party through a cash-predominant secondary market (i.e. not traded through brokerage firms). There will be no record of bond owners maintained and submitting a physical bond certificate is all that is required to receive payment. This will limit transparency and bondholder recourse in the event of theft or inadvertent destruction of their bonds. In this situation, the City will have no control over the secondary market and, theoretically, bonds originally sold only to Berkeley residents could end up being owned by investors in any geographic location.

If the City sells the minibonds directly to the public and maintains a current record of bond owners (a role traditionally held by a trustee or paying agent), the City could restrict the

² Proposed par amount for the Madison, Wisconsin, minibond issue was \$2.1 million, final par fell significantly short due to market volatility during bond sale

³ Proposed par amount for the Burlington, Vermont, minibond issue was \$5.3 million, final par was \$123,000 short

⁴ Proposed par amount for the Vancouver, Washington, minibond issue was \$1.5 million, final par was \$203,500 short

original bondholder's ability to resell the minibond. The City could impose regulations on re-sale of the bonds (by limiting them to re-sale in a specific geographic location) and therefore reducing liquidity options to the bondholder. This will also result in an undetermined impact on staff resources unless the bond administration is outsourced to a trustee/paying agent. In addition, the City may be able to defray some of the ongoing administrative expenses through an administrative fee for filing change of ownership paperwork related to any secondary market resale of the microbond.

Both options discussed above (bearer bonds or bond owner registry) have the potential to negatively impact the pricing due to limitations on the secondary market. Typically, if an investor does not perceive there is liquidity of the bond, the required yield for the investment will be higher to offset this risk. The City does not take on responsibility for this liquidity risk and therefore will need to provide appropriate disclosure to a potential investor of the minibond.

The use of an underwriter/investment bank typically provides the bondholder liquidity by creating a secondary market pricing mechanism (not directly serving the City). The City would take no financial or market risk after the initial sale of the minibond to the original investors and would not play any part of the secondary market trades. As discussed earlier, the City would need to create some registry or tracking system to ensure timely payments of interest and principal to bondholders of record as secondary market transactions occur.

Potential Project Financing

Based on research of recent microbond financing projects nationwide, projects best suited should be easily-identifiable and a clear benefit to maximize community engagement in the financing. Public participation, through the purchase of small denomination bonds directly from the City, is best accomplished when the community understands the project. City staff believe a potential candidate would be the purchase of new fire trucks programmed in FY 2020/21 for \$2,000,000 - \$4,000,000.

Financing Considerations

The City has traditionally either cash-funded equipment acquisitions or financed them directly with a lender through some form of open market competitive bidding process (among financial institutions). Larger capital projects have been funded through the issuance of bonds which are sold to the capital markets through investment banks, which in turn resell the bonds to individuals, money managers or institutional investors (investment funds).

Based on the size and the estimated 10-year final maturity of the proposed financing, a direct placement with a financial institution would be the traditional approach. This would require the City to solicit bids from all interested firms with the primary requirement that the firm hold the interest rate and commit to purchasing the entire amount required for the project.

Under a microbond structure, the amount raised depends on community interest and engagement, and there could be a shortfall between what local investors are willing to purchase and what the City requires. A contingency plan will need to be developed to fund the shortfall (if any) which could include the allocation of existing unencumbered reserves or the secondary issuance from traditional financing institutions.

Additionally, for a traditional financing, ongoing bond administration (i.e. maintaining records on bondowners and making interest and principal payments) would be fulfilled by a bond trustee. The City pays the bond trustee annual fees for these services. In recent minibond financings, there are several instances where the issuing city has served as its own bond trustee and dedicated city staff to ongoing bond administration. This method is not recommended given the shortage of staff resources in the City's Finance department. If the City proceeds with a microbond structure, it is recommended that Trustee services be outsourced to a third party.

Financing Implementation

A traditional financing is managed by staff with the support of professionals including legal, financial advisory and underwriting banks. A microbond financing does not require a traditional underwriting but there is a role for identifying potential investors, processing investments and answering due diligence questions.

The City can elect to do this work internally or engage the services of a firm that can do the outreach and manage the questions. Mainstream public finance firms have created marketing methods to solicit local investor interest through media and traditional mailings while younger technology firms have developed new techniques to identify investors and create a platform for their participation and investment.

If the City Council directs staff to pursue the implementation of a microbond financing program, staff recommends issuing a request for proposals for firms interested in assisting the City with the marketing, outreach and distribution of the microbond financing program.

Administration of the microbond is the critical issue prior to any decision to move forward. As stated above, the City has typically outsourced the bond administration through a trustee or paying agent. The annual cost is typically \$5,000 but could be significantly higher given the unique nature of a microbond structure. How the bonds are registered or recorded will dictate administrative process for making interest and principal payments to the appropriate bondholders.

The second key administrative component is managing ownership of the microbonds. If the City allows bondholder to sell or trade their bonds, an appropriate registration structure must be in place to assure bond payments are made to the rightful owner. The solution to this issue will be a function of how the microbonds are recorded. If they are physical bonds, the City will have less control over tracking ownership as the bondholder

with the “paper” will be the owner. If the microbonds are only “recorded”, then a master registry is maintained and edited as bondholders elect to sell or trade their bonds in the future. This function can either be done by the City staff or outsourced as discussed above.

Recommended Questions and Considerations

In the issuances of minibond sales listed above, examining the case studies reveal some key questions and considerations for the City:

I. What is the City’s objective for the financing?

It should be noted that if the City’s objective is saving on transactional costs associated with the issuance that a minibond sold directly from the City or through an underwriter’s retail distribution network may have lower transactional costs. If the City’s objective is to obtain project funds with the lowest cost available, then a traditional bond issuance is advised since it is probable that issuing a minibond will result in the City obtaining interest rates on the financing that are slightly above market rates, resulting in the City paying a higher amount of interest over the life of the bond. If the City’s objective is to ensure that adequate project funds are raised through the financing, then a traditional financing seems to be the best option. Several of the minibond cases evaluated resulted in insufficient project funds being raised through the minibond issuance alone. The City can remedy this if it is willing to contribute capital to make up any shortfalls in the amount raised through the minibond financing, low interest rates point toward traditional bond issuance. Finally, if the City’s objective is community engagement on the project, then a minibond campaign with a community marketing program seems to be the best strategy.

II. To what extent would the City geographically limit the sale of the bonds?

In order to maximize community engagement, the City may wish to geographically restrict the bond sale (to city or county residents). However, it should be noted that this increases the chance of failing to raise the necessary amount. To mitigate the risk of a funding shortfall, the City could consider a priority sale period for City residents followed by a broader sale period to the general public (statewide or nationwide) to ensure that the full par amount is sold. Additionally, it is worth noting that if the City would like to limit the maximum amount of the minibonds that can be purchased by any one investor (to avoid a situation where a trust or other institutional fund buys the bonds through a retail account), there is an increased risk of a funding shortfall.

III. What amount of additional administrative work is the City willing to undertake for a minibond issuance?

Community engagement and marketing on a geographically restricted bond sale is important and successful minibond issuances have included significant marketing efforts (i.e. dedicated web page, dedicated phone lines, staff handling mailed-in documents, physical presence of staff and professionals at bond sale workshops at City hall). A key consideration is whether the benefits of the community engagement outweigh the increased administrative burden associated with minibond sales.

IV. How would the City handle appropriate rounding on interest payments for minibonds?

If the City issues bonds in increments lower than \$1,000 it is conceivable for there to be an instance where it owed 3.375% interest on a \$500 bond with a total interest payment of \$16.875. Given the difficulties associated with paying fractional pennies to a bond owner as an interest payment, would the city round the interest payment up to the nearest penny, effectively paying extra interest? Alternatively, the City could choose to only issue the bonds with interest amounts rounded to the nearest 100th to avoid this situation, but this may result in the City effectively paying more interest on the financing than it would have needed to pay on a traditional bond.

V. Would the City consider use of capital appreciation bonds for a minibond issuance?

Given the administrative load associated with paying semiannual interest payments to minibond owners the majority of recent minibond issuances have issued zero-coupon bonds or capital appreciation bonds. With a zero-coupon bond or capital appreciation bond, the City would only make one payment to minibond owners at maturity of the minibonds. Issuing current interest bonds without the use of a 3rd party trustee would require the City to directly pay periodic interest and final principal on the minibonds to the bond owners, a process requiring significant ongoing commitment of staff time. One drawback to issuing capital appreciation bonds is that, on average, an issuer pays more interest on a capital appreciation bond than on a comparable current interest bond. Based on the City's Debt Management Policy, capital appreciation bonds are not expressly prohibited, provided the City complies with the policy's goals through the issuance. Finally, it is worth noting that issuing the City's minibonds through a capital appreciation bond would likely resolve the Consideration IV above.

ENVIRONMENTAL SUSTAINABILITY

Not applicable.

POSSIBLE FUTURE ACTION

The City Council can take a formal action directing staff to develop a microbond financing program for the funding of the proposed fire equipment. A formal action item approval will be required to incur any financing program at which time the decision to utilize a microbond would be made.

FISCAL IMPACTS OF POSSIBLE FUTURE ACTION

The implementation of a microbond financing program may meet the policy objective of local community engagement and an opportunity for local investors to participate in the City's financing program for capital projects, but it may inhibit the City's ability to access the lowest cost of funds typically achieved through a competitive bid structure that has no limitations on participation.

There will definitely be a financial cost to administering this program, somehow ownership will need to be maintained, interest payments made and dealing with any issue that might arise. This will need to be factored into the cost of these program.

It is not possible to objectively quantify the difference between a local-only investor strategy versus a traditional open-market strategy but evidence of the Denver 2014 microbond program indicates that interest rates were higher than comparable bonds issued by Denver at that time in the market.

A second risk of a microbond financing is the potential exposure to a shortfall of proceeds in the event all the microbonds are not sold. While a traditional underwriting will guarantee the full amount required, the City could have an unfunded portion which would need to be funded by some other source of revenues or secondary financing.

CONTACT PERSON

Henry Oyekanmi, Director, Finance, 510-981-7326

Attachments:

- 1: NHA Advisors Microbond Research Report and Feasibility Memorandum dated March 1, 2019
- 2: Original Referral Report from May 1, 2018, "Berkeley Microbond Blockchain Initiative – Pilot Project"



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San Rafael, CA 94903

Office: 415.785.2025
www.NHAadvisors.com

RESEARCH REPORT AND FEASIBILITY MEMO

Date: March 1, 2019

To: Henry Oyekanmi, Finance Director, City of Berkeley

From: NHA Advisors, LLC

RE: City of Berkeley Minibond – Research Report and Feasibility Memo

Definitions of Minibonds

In the last few years, the use of minibonds¹ has increased as issuers look to raise funds for capital projects while tapping local investors who are interested in investing but are typically restricted given the \$5,000 minimum denomination of a traditionally-structured municipal bond. Minibonds are sold in increments significantly less than \$5,000 with the most popular increments being \$1,000 and \$500. “Microbond” refers to bond denominations of \$100 or less, but there is no common industry standard for use of that term and some issuers elect to use the term minibond to refer to bonds denominated in increments as low as \$25.

Minibonds are often sold directly by the municipal entity to the investing public. Earlier instances of this direct sale required mailed-in or hand-delivered orders of physical certificates, but more recent minibond issuances have utilized internet or other proprietary networks to facilitate the order process. In a direct sale scenario where the bond is not underwritten by an investment bank which means there is very limited secondary markets for the bonds and the owners are often required to own the minibonds for their entire maturity. Depending on the structure of the minibond, there will be physical certificates or a registry that tracks ownership of each bond. This differs from a traditional bond sales method that utilizes an underwriter to serve as the intermediary market maker and a trustee who manages the registry of bond owners (as well as facilitating the principal and interest payments).

History of Minibonds

Minibonds have been used for several decades by local governmental agencies to access residents and a group of potential investors typically not participating in traditional bond sales. Examples of prior Minibond are discussed below.

In 1990, the City of Mission Viejo, California, issued minibonds with denominations of \$500 to finance a portion of the city hall renovations. While the City’s objective was to raise \$500,000, the minibond issuance raised \$140,500. To mitigate the risks of insufficient capital raised, this minibond issuance was part of a larger \$4.5 million bond issuance. The minibond issuance brought in orders from 35 individual investors, with order sizes ranging up to \$30,000.

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In 1991, the City of Anaheim, California, issued \$3.4 million in minibonds. These minibonds were issued as zero-coupon bonds (meaning that the bonds were purchased at a discount and bond owners were paid the face value of the bonds at maturity). Unlike many other minibond issuances at that time, these minibonds were not issued as part of a larger financing.

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More recently, in December 2008, Bergen County, New Jersey, sold \$610,000 in zero-coupon minibonds in to finance improvements to its parks system. This minibond issuance was part of a larger, \$69 million competitively sold bond offering. In 2009 and 2010, the State of Minnesota sold bonds in \$1,000 denominations. And in 2011 the State of Massachusetts sold \$5 million of minibonds in \$1,000 denominations as part of a larger \$490 million financing.

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In 2014, the City of Denver issued a \$12 million minibond denominated in \$500 increments as part of a larger, \$550 million financing. Denver sold their minibonds directly to Colorado residents and made headlines for selling out in a short window. This memo discusses Denver’s minibond issuance in greater detail below. Since 2015, there have been minibond issuances for the cities of Vancouver (Washington), Burlington (Vermont), Lawrence (Kansas), Cambridge (Massachusetts), Madison (Wisconsin), and Somerville (Massachusetts). These minibond issuances are detailed in a table in the subsequent section. One unifying feature of the minibond issuances in Burlington, Lawrence, Cambridge, Madison, and Somerville was that each of these cities was home to a major university or college. One driving consideration for issuing minibonds is community engagement and, as one of the financing participants on these minibond issuances said, “Communities that are innovative and engaged are usually college towns. They are the ones with the most participation.”

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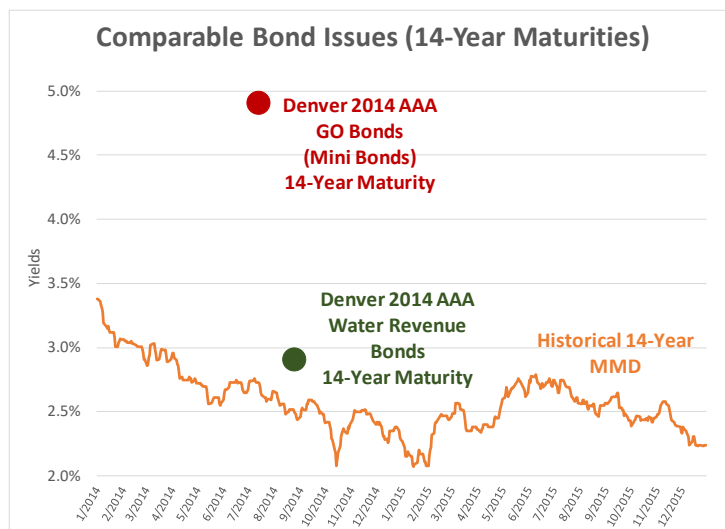
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In selecting a project to finance through minibonds, issuers tend to focus on smaller, defined projects within a larger financing plan that have tangible connection to a local investor base. The objective is to maximize local investor participation in the minibond offering by selecting an easily identifiable project that the community has expressed interest in or would directly benefit from.

Recent minibonds have been sold through two primary channels – either issued directly from the municipal authority or issued electronically through an underwriter’s retail distribution network. Because of the complexity of developing an online ordering system, issuing directly from the municipal authority typically required mailed-in orders and physical transfer of the bond certificates and requires bond owners to hold the certificates until maturity and submit them to the municipal authority to receive payment. The minibonds of the early 1990’s and the 2015 Vancouver, Washington, minibonds (detailed in the table below) were sold through this method.

If an issuer is willing to develop an online platform to issue minibonds directly, they can facilitate the bond sale through the internet. The 2014 Denver minibonds which made news headlines for selling \$12 million in 20 minutes were issued directly from the City and orders could be delivered online, mail, and hand delivery. Denver offered the bonds for sale online two hours before they began accepting mailed-in or hand delivered orders, and as a result, some residents expressed frustration that the bonds sold out before any physical orders were processed. Also, though orders for the Denver minibonds could be placed online, the orders were not automatically processed, and city staff time was required to process each order. As a result, the City had 375 extra online orders before the sale of the minibonds closed.

It is worth noting that the City of Denver’s widely-publicized success at issuing the 2014 minibonds may be a combination of several factors. First, the city had issued minibonds four times prior to the 2014 minibond issuance, with the most recent being issued in 2007, had a track record and developed an investor base for the minibonds. Finally, research indicates that the City of Denver’s 2014 minibonds were issued at yields significantly above market rates at that time. The 9-year maturities were issued at 4.38% and 14-year maturities were issued at 4.89%. By comparison a month later the City of Denver issued water revenue bonds (with the same “AAA” rating as the city’s general obligation minibonds) which were sold to institutional investors using typical underwriting, legal, and advisory



services. These water revenue bonds priced with a yield on the 9-year maturity less than 2.5% and the yield on the 14-year maturity less than 3%. The graphic to the right highlights the difference in yield on the 14-year maturities between the 2014 Minibonds, the 2014 Water Revenue bonds, and the 14-year MMD.

The second, newer channel for issuing minibonds is through an underwriter's retail investor distribution network. This process mitigates the requirement for City staff to process orders oversee the sale process. To maximize local investor participation, the underwriter can assist the issuer with the marketing process through print and digital campaigns. There is also potential for an underwriter's involvement and records mitigating the administrative workload of maintaining the list of bond owners and facilitating transfer of the bonds between bond owners. However, we note that this role of maintaining a book of bond owners has been traditionally filled by DTC Corporation on bond issuances (typically paid as a component of the underwriter's discount).

The following table highlights some of the recent minibonds sold and key characteristics of those issuances:

Details on Recent Minibond Issuances							
Year	Issuer	Minibond Financed Project	Minibond Par	Minibond Denomination	Amount Financed (All Bonds)	Issuer Rating	Sale Period
2018	Somerville MA	Multiple Projects	\$500,000	\$1,000	\$11.3 million	AA+/Aa1	7 Days
2018	Madison WI	Botanical Gardens	\$876,000 ²	\$500	\$100 million	Aaa	6 Days
2018	Cambridge MA	Not Available	\$2,000,000	\$1,000	\$84.5 million	AAA/Aaa	6 Days
2017	Lawrence KS	Fire Truck	\$654,000	\$1,000	\$21.9 million	Aa1	4 Days
2017	Burlington VT	Sidewalks, Streets, Waterfront Access	\$5,144,000 ³	\$1,000	\$5.14 million	A3	1 Day
2015	Vancouver WA	Barracks Renovation	\$1,296,500 ⁴	\$500	\$24.4 million	AA/Aa3	10 Days
2014	Denver CO	City cultural facilities	\$12,000,000	\$500	\$550 million	AAA/Aaa	1 Day

Proposed Project

In 2018, Berkeley City Council directed staff to explore the feasibility and steps required to implement a Pilot Project for the Community Microbond Initiative. This directive included identification of the financing project, identification of City staff involved, analysis of financing costs, discussion on the process of selecting relevant vendors, and an outline of the necessary steps to achieve a pilot microbond financing. Based on our research on recent minibond financing projects nationwide, projects ideally suited for a minibond financing should be an easily-identifiable project and a project that provides clear benefit to the community to maximize community engagement for the financing.

Through discussions with City staff, the proposed fire truck acquisition has been identified as an impactful project for a pilot microbond financing. The cost of the fire trucks (approximately \$2,000,000 to

²Proposed par amount for the Madison, Wisconsin, minibond issue was \$2.1 million, final par fell significantly short due to market volatility during bond sale

³ Proposed par amount for the Burlington, Vermont, minibond issue was \$5.3 million, final par was \$123,000 short

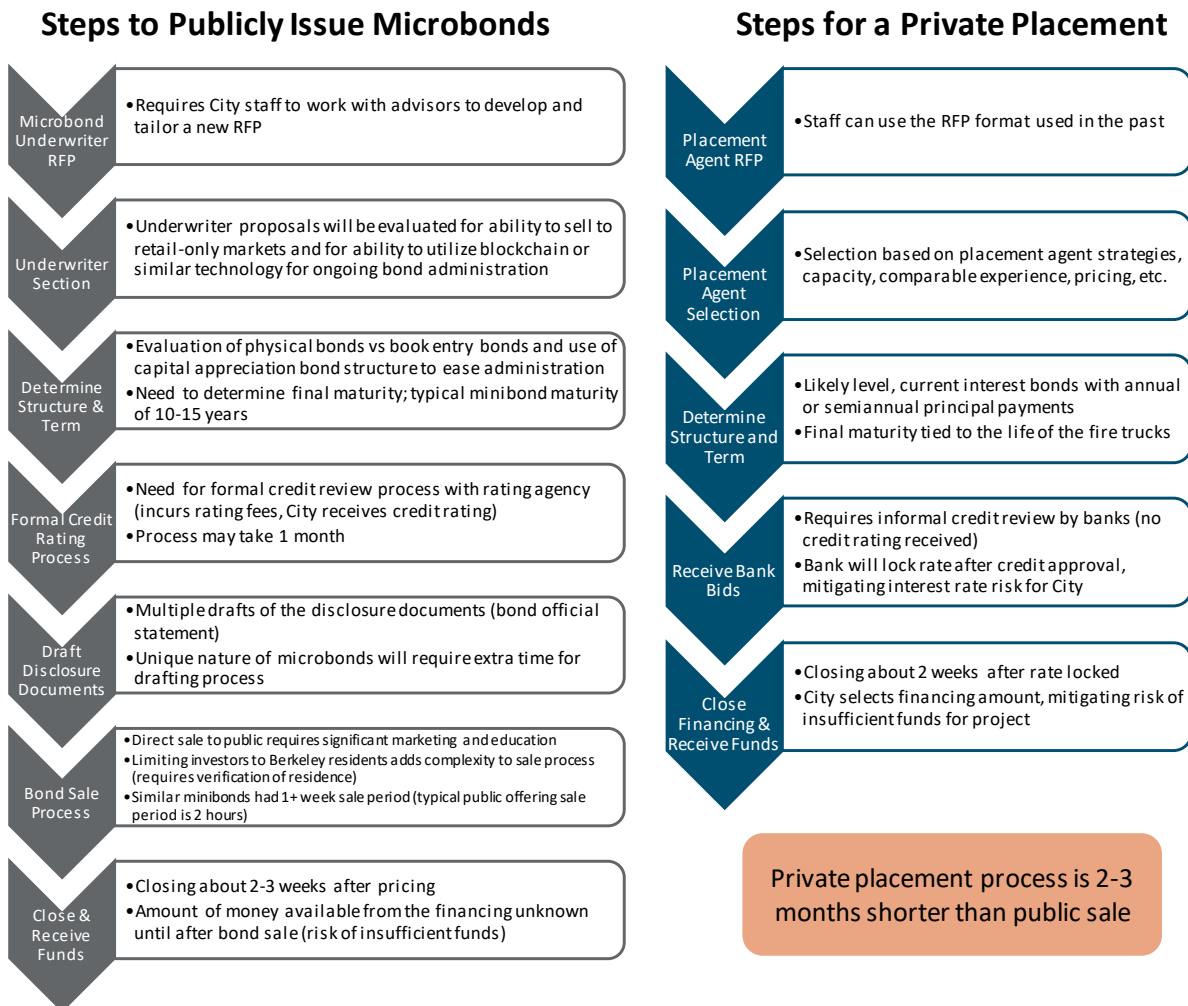
⁴ Proposed par amount for the Vancouver, Washington, minibond issue was \$1.5 million, final par was \$203,500 short

\$4,000,000) is small enough to allow the City flexibility to cover any funding shortfall in the event community support and participation is insufficient to generate the total amount required for the project. In addition, the fire department’s timeline for the fire truck acquisition is sufficiently long to allow for the development of the pilot microbond financing program and selection of appropriate vendors.

Based on the size and the estimated 10-year final maturity of the proposed financing, a private placement would traditionally be the optimal sale strategy. Based on this assumption, **the appropriate comparison of financing plans and sale strategies examines a traditional private placement versus a Microbond public offering.**

Necessary Steps for a Traditional Financing and a Microbond Financing

Typically, the additional steps associated with a public offering take approximately 30-60 days longer than a private placement due to the formal credit review process, drafting primary disclosure documents, bond marketing, and closing process. Given the complexity and initial work related to a pilot program (including lengthy marketing and public engagement component and longer bond sale window), we anticipate that a minibond financing will add 60-90 days to the typical financing process.



Comparison of Required Financing Participants

As detailed in the table below, comparison of financing teams involved implies that the team required for the public sale of microbonds requires more professionals than the financing team the City would typically engage for a private placement. For comparative purposes, the table also lists the financing participants required for a traditional public offering.

A public microbond offering may remove the need for services traditionally offered by the bond trustee (i.e. maintaining record of bondowners and making required principal and interest payments), provided the underwriter or the City takes on that role. This is discussed further in the “Ongoing Bond Administration Considerations” section later in this report.

Due to Securities and Exchange Commission regulations, any public sale of a security (i.e. stock, bonds, etc.) to non-sophisticated investors requires the preparation and dissemination of a disclosure document (i.e. bond prospectus or official statement). This requirement necessitates the use of disclosure counsel to write the official statement for a public offering. In a private placement, the bonds are sold to sophisticated investors (i.e. banks staffed with finance professionals) and the City is exempt from the need for a primary disclosure document.

Financing Team Member	Role of Financing Team Member	Traditional Private Placement	Traditional Public Offering	Microbond Public Offering
Municipal Advisor	Provides services related to structuring and selling the City’s bonds	✓	✓	✓
Bond Counsel	Determines legal authority to issue bonds, tax status of the bonds, provides opinion	✓	✓	✓
Disclosure Counsel	Prepares primary disclosure document		✓	✓
Underwriter	Purchases the City’s bonds and re-sells them to the investing public		✓	✓
Placement Agent	Serves as a broker to market the City’s bonds to banks	✓		
Underwriter’s Counsel	Provides a legal counsel to the underwriter		✓	✓
Trustee	Ongoing administration (maintain record of bond owners, ensure payments are made on time)	✓	✓	<i>Uncertain</i>
Rating Agency	Publishes rating report outlining strengths & weaknesses of City’s credit		✓	✓
Bond Insurer	Provides policy on the City’s bonds, increasing investor confidence in repayment	<i>Unlikely</i>	<i>Unlikely</i>	<i>Unlikely</i>

With the City of Berkeley’s General Fund credit rating of “AA” from S&P Global, it is unlikely that the City would pursue bond insurance regardless of the sale method. While a private placement would not require a formal credit rating process, a public offering (either traditional financing or a microbond financing) would require an official credit rating from a major rating agency.

For a microbond financing, the City’s intention is to reach as many smaller investors as possible. To do this, an underwriter typically markets the bonds to a target audience of investors within the City or advertises locally to educate residents about the opportunity to invest in the City’s bonds. This approach is different from a traditional, national marketing and bond sale approach that targets any investors willing to take the lowest interest rate.

Analysis of Financing Costs

Early microbond presentations to City Council have indicated that the use of a decentralized, distributed, electronic record (i.e. “blockchain”) may enable the City to minimize issuance costs by removing certain “middle men” from the financing. As discussed above, review of the necessary financing participants for a financing reveals that it is difficult to verify this claim until the City requests proposals from qualified firms to evaluate where potential economies of scope lie.

The cost *estimates* in the table below compares a traditional private placement and a publicly-financed microbond. It assumes a 10-year financing to raise approximately \$2 to \$4 million. It also assumes that the publicly-issued bonds go through a formal rating process with a rating agency. As noted above, given the City’s credit rating it is unlikely that there will be economic benefit to utilizing bond insurance for this financing and it has been excluded from the table below.

Financing Professionals Involved	Private Placement Estimates	Microbond Estimates
Municipal Advisor	\$25,000-\$35,000	\$25,000-\$35,000
Bond Counsel	\$25,000-30,000	\$25,000-30,000
Disclosure Counsel	-	\$35,000-40,000
Placement Agent	\$20,000-\$30,000	-
Underwriter (Incl. UW Counsel)	-	Unknown
Trustee/Paying Agent	\$5,000	Unknown
Rating Agency	-	\$12,500

Based on our preliminary analysis above, we note that the additional disclosure costs associated with a publicly-issued microbond has the potential to result in an overall higher cost of issuance than if the City were to pursue that same amount of funding through a traditional private placement. Another cost consideration is the amount of City staff time involved in either sale approach. Given the unique nature of a microbond financing, it is conservative to assume a greater amount of staff time required for the microbond financing process.

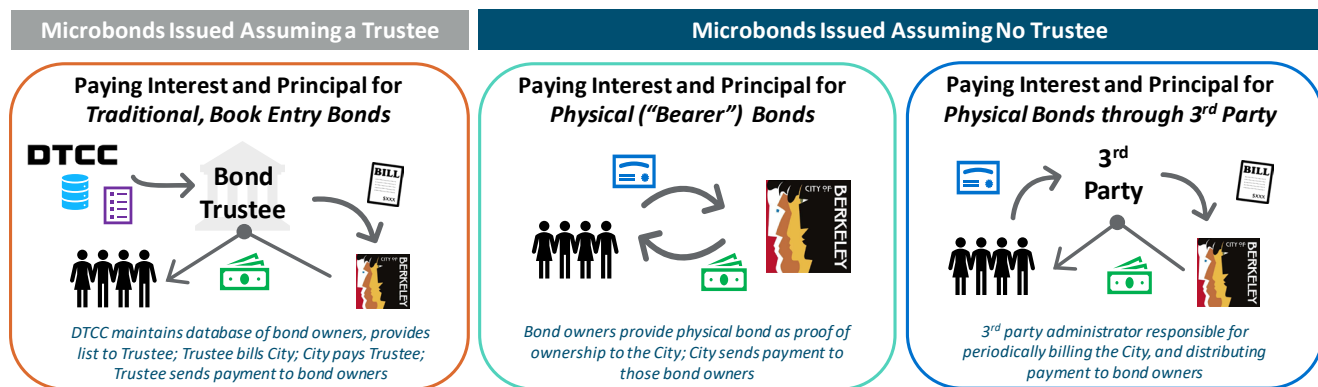
Ongoing Bond Administration Considerations

A typical bond issue will include the engagement of a 3rd party trustee or paying agent to manage the registry of bond ownership as well as make the interest and principal payments to the bond holders. If ownership changes hands over time, a process or recordkeeping and validation needs to exist to guarantee the payments are made to the appropriate bondholder. Structuring consideration for a Microbond financing that will remove the need for a traditional trustee includes the use of physical bonds

in place of a book entry, registered bond. Several recent public sales of minibonds utilized this structure – the 2015 Vancouver, WA, minibonds and the 2014 Denver, CO, minibonds are two recent examples.

Traditionally, the City’s publicly-offered bonds are assigned CUSIP numbers (unique, nine-digit identifiers) and records are held with the Depository Trust Company (“DTCC”) in New York. DTCC acts as securities depository for the bonds and maintains a record of bondowners that the trustee uses when principal or interest are due.

If the City utilizes a physical bond (“bearer bond”) alternative, payments are made to the individual who has physical possession of the bond at interest and principal dates. The burden for payment resides with the bondholder who is required to submit coupons (proof of ownership) in order to receive payment of interest or principal. While this transfers the responsibility of requesting payment to the bondowner, it is worth noting that these bonds are difficult to transfer to secondary owners or protect against theft. Therefore, it is reasonable to expect that the use of physical bonds may result in fewer investors buying the City’s bonds or in the bonds pricing less competitively given the lack of secondary market.



For a physical, “bearer” bond, City will not require a bond trustee, and City staff will be required to manage the payments to bondholders. **Requiring the City to administer the bonds (i.e. make ongoing interest and principal payments) will negatively impact City staff time and resources and is not recommended.** However, there is the possibility for the City to hire a 3rd party to manage the ongoing bond administration, with the 3rd party being responsible for verifying bond owners, billing the City for interest and principal, and distributing money received from the City to the bond owners.

That alternative was previously presented to City Council in 2018 and included the use of a proprietary system based on distributed, decentralized ledger technology (i.e. “blockchain”) to maintain a record of bondowners and remit payment. Given the novelty and proprietary nature of this system, it is not clear exactly how it will work and requires estimation regarding actual impact on City staff.

Secondary Market and Liquidity Considerations

The structure of the Microbond will determine what kind of secondary market there is available to bond owners. If the City directly sells the bonds to local investors (i.e. without using an underwriter or placement agent), the City will most likely sell the Microbonds as bearer bonds or create a registry to manage ownership over the term of the outstanding bonds. If the registry concept is utilized, the City could preclude original bondholders from selling their Microbonds to others to avoid the administrative difficulty of tracking the appropriate ownership. If the City elects to provide liquidity, a more comprehensive tracking process will be required.

If the City sells the Microbonds directly to the public as bearer bonds, a bond owner will be required to physically present their bond certificate to the City to receive interest and principal payments (historically called “clipping coupons”). These bonds will be transferrable from one party through a cash-predominant secondary market (i.e. not traded through brokerage firms). There will be no record of bond owners maintained and submitting a physical bond certificate is all that is required to receive payment. This will limit transparency and bondholder recourse in the event of theft or inadvertent destruction of their bonds. In this situation, the City will have no control over the secondary market and, theoretically, bonds originally sold only to Berkeley residents could end up being owned by investors in any geographic location.

If the City sells the Microbonds directly to the public and maintains a current record of bond owners (a role traditionally held by a trustee or paying agent), the City could restrict the original bondholder’s ability to resell the Microbond. The City could impose regulations on re-sale of the bonds (by limiting them to re-sale in a specific geographic location) and therefore reducing liquidity options to the bondholder. This will also result in an undetermined impact on staff resources unless the bond administration is outsourced to a trustee/paying agent. In addition, the City may be able to defray some of the ongoing administrative expenses through an administrative fee for filing change of ownership paperwork related to any secondary market resale of the Microbond.

Both options discussed above (bearer bonds or bond owner registry) have the potential to negatively impact the pricing due to limitations on the secondary market. Typically, if an investor does not perceive there is liquidity of the bond, the required yield for the investment will be higher to offset this risk. *The City does not take on responsibility for this liquidity risk and therefore will need to provide sufficient disclosure to a potential investor of the Microbond.*

The use of an underwriter/investment bank typically provides the bondholder liquidity by creating a secondary market pricing mechanism (not directly serving the City). The City would take no financial or market risk after the initial sale of the Microbond to the original investors and would not play any part of the secondary market trades. As discussed earlier, the City would need to create some registry or tracking system to ensure timely payments of interest and principal to bondholders of record as secondary market transactions occur.

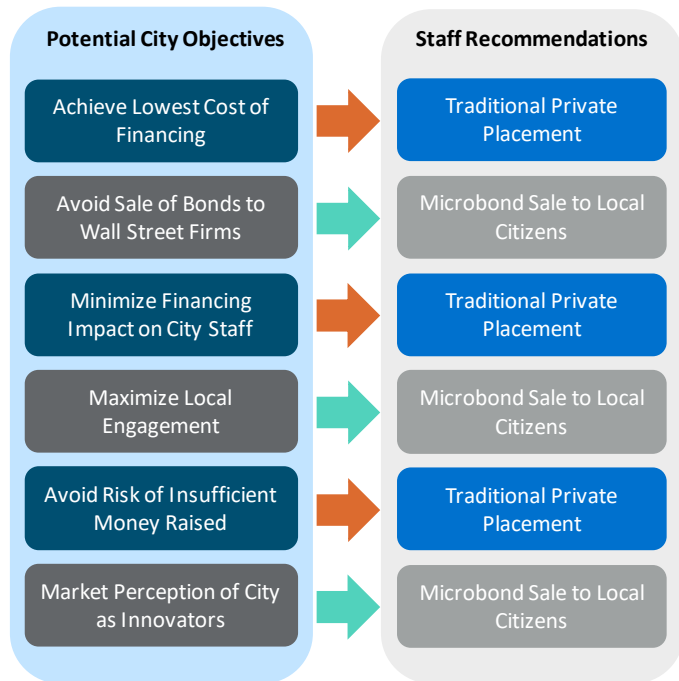
Recommended Questions

Examining the case studies of recent minibond issues reveal some key questions and considerations for the City of Berkeley, along with some comments based on our research and findings.

What is the City’s objective for the financing?

If the City’s objective is to maximize local engagement, avoid sale of City bonds to Wall Street firms, or enhance the Market’s perception of the City as innovators in municipal finance, the recommended method of sale is likely a microbond sale publicly issued to local citizens.

If the City’s objective is to minimize the cost of borrowing (i.e. lowest interest rate), minimize impact on City staff (for sale process and for ongoing bond administration, and avoid the risk of insufficient funds being raised from the financing (requiring the City’s general fund reserves to provide the remainder), the recommended method of sale is a traditional private placement.



To what extent would the City geographically limit the sale of the bonds?

We note that in order to maximize community engagement, the City may wish to geographically restrict the bond sale (to city or county residents). However, we further note this increases the chance of failing to raise the necessary amount. To mitigate the risk of a funding shortfall, the City could consider a priority sale period for City residents followed by a broader sale period to the general public (statewide or nationwide) to ensure that the full par amount is sold. Additionally, it is worth noting that if the City would like to limit the maximum amount of the minibonds that can be purchased by any one investor (to avoid a situation where a trust or other institutional fund buys the bonds through a retail account), there is an increased risk of a funding shortfall.

What amount of additional administrative work is the City willing to undertake for a minibond issuance?

Community engagement and marketing on a geographically restricted bond sale is important and successful minibond issuances have included significant marketing efforts (i.e. dedicated web page, dedicated phone lines, staff handling mailed-in documents, physical presence of staff and professionals at bond sale workshops at City hall). A key consideration is whether the benefits of the community engagement outweigh the increased administrative burden associated with minibond sales.

Ongoing bond administration will also require additional staff time if the bonds are sold directly from the City to investors. The impact of this extra workload on City staff is unknown at this time. We note, however, that the City will likely be able to hire a third party to manage ongoing bond administration to mitigate this staff impact.

How would the City handle appropriate rounding on interest payments for minibonds?

If the City issues bonds in increments lower than \$1,000 it is conceivable for there to be an instance where it owed 3.375% interest on a \$500 bond with a total interest payment of \$16.875. Given the difficulties associated with paying fractional pennies to a bond owner as an interest payment, would the city round the interest payment up to the nearest penny, effectively paying extra interest? Alternatively, the City could choose to only issue the bonds with interest amounts rounded to the nearest 100th to avoid this situation, but this may result in the City effectively paying more interest on the financing than it would have needed to pay on a traditional bond.

Would the City consider use of capital appreciation bonds for a minibond issuance?

Given the administrative load associated with paying semiannual interest payments to minibond owners the majority of recent minibond issuances have issued zero-coupon bonds or capital appreciation bonds. With a zero-coupon bond or capital appreciation bond, the City would only make one payment to minibond owners at maturity of the minibonds. Issuing current interest bonds without the use of a 3rd party trustee would require the City to directly pay periodic interest and final principal on the minibonds to the bond owners, a process requiring significant ongoing commitment of staff time. One drawback to issuing capital appreciation bonds is that, on average, an issuer pays more interest on a capital appreciation bond than on a comparable current interest bond. Based on our review of the City's Debt Management Policy, capital appreciation bonds are not expressly prohibited, provided the City complies with the policy's goals through the issuance. Finally, it is worth noting that issuing the City's minibonds through a capital appreciation bond would likely resolve the Consideration IV above.

What kind of secondary market does the City wish to provide for bond owners?

If the City limits the secondary market for the bonds, that could increase the interest rates that investors require. Since the City may elect to limit the initial sale of the bonds to residents, the amount of flexibility that a bond owner has to re-sell their bonds will further impact the pool of potential investors. If the City uses a bearer bond structure, the City loses the ability to control the secondary market on the bonds and a bond owner could sell their bonds to any individual, regardless of their geographical location. If the City directly sells the bonds to residents (without securitizing the bonds), the City can maintain control over bond transfers between owners in the secondary market. However, both options have the potential to increase the interest rates that investors require due to the lack of secondary market. The City could use an underwriting firm to sell fully-securitized bonds to local citizens to avoid interest rate impact, but the City would lose the ability to regulate ownership in the secondary market.

Conclusion and Summary

The City has the option and ability to finance the proposed fire equipment by accessing the capital markets through either a traditional public offering or some form of Microbond financing structure. The Microbond structure can target key investors such as Berkeley residents or neighboring communities who have an investment appetite for smaller bond amounts. While minibond financing programs have been used across the United States, they are relatively infrequent and used for smaller projects than those financed through traditional public finance. One risk in a Microbond financing is the lack of investor appetite (at competitive rates) which could produce a shortfall in funding for the City's proposed project. City staff has indicated that this risk can be mitigated through a second traditional public offering or the allocation of existing City reserves.

The City's existing financing team (bond, disclosure counsel and municipal advisor) will work with City staff to develop any necessary requests for proposal to provide the services necessary for Microbonds which could include trustee/paying agent and potential underwriting firm to assist in the marketing and bondholder engagement.

Given the current unknown nature of ongoing Microbond administration, the concept of utilizing distributed, decentralized ledger technology (i.e. "blockchain") must be taken into consideration when allocating City staff time to this project. The transaction costs of a Microbond will not be known until an RFP process for underwriting services is complete. While the interest cost for a Microbond is unknown at this time, we note that recent minibond sales (like the 2014 Denver Minibonds) were priced at higher-than-market interest rates to increase demand from local retail investors.

Additional time could also be required if the City elects seek a bond rating on the Microbond structure and any unique marketing and outreach to potential investors. The financing timeline for a microbond sale is anticipated to be 30-60 days longer than the timeline for a traditional bank direct placement (used in the past for the City's small equipment purchases).

The City will not be obligated to guarantee liquidity to any Microbond investor prior to the maturity date selected by the bondholder at the time of purchase. If the City Council elects to create some form of liquidity option, the use of a 3rd party financial institution will be necessary unless the City agrees to repurchase the Microbond as part of the original structure at some identified pricing formula. Unless otherwise written into the Microbond, the City will have no obligation to support any bondholder in the event they require liquidity.

Finally, it is worth noting the benefits to the City from local investor engagement and being perceived as a pioneer in public finance. However, it is difficult to quantify these benefits and they could be offset by a myriad of unknown factors and additional staff resources associated with a Microbond financing program.

NHA Advisors, LLC is registered as a Municipal Advisor with the SEC and Municipal Securities Rulemaking Board (“MSRB”). As such, NHA Advisors, LLC has a Fiduciary duty to the public agency and must provide both a Duty of Care and a Duty of Loyalty that entails the following.

Duty of Care

- a) exercise due care in performing its municipal advisory activities;
- b) possess the degree of knowledge and expertise needed to provide the public agency with informed advice;
- c) make a reasonable inquiry as to the facts that are relevant to the public agency’s determination as to whether to proceed with a course of action or that form the basis for any advice provided to the public agency; and
- d) undertake a reasonable investigation to determine that NHA Advisors, LLC is not forming any recommendation on materially inaccurate or incomplete information; NHA Advisors, LLC must have a reasonable basis for:
 - i. any advice provided to or on behalf of the public agency;
 - ii. any representations made in a certificate that it signs that will be reasonably foreseeably relied upon by the public agency, any other party involved in the municipal securities transaction or municipal financial product, or investors in the public agency securities; and
 - iii. any information provided to the public agency or other parties involved in the municipal securities transaction in connection with the preparation of an official statement.

Duty of Loyalty

NHA Advisors, LLC must deal honestly and with the utmost good faith with the public agency and act in the public agency’s best interests without regard to the financial or other interests of NHA Advisors, LLC. NHA Advisors, LLC will eliminate or provide full and fair disclosure (included herein) to Issuer about each material conflict of interest (as applicable). NHA Advisors, LLC will not engage in municipal advisory activities with the public agency as a municipal entity, if it cannot manage or mitigate its conflicts in a manner that will permit it to act in the public agency’s best interests.



Councilmember Ben Bartlett
City of Berkeley, District 3

ACTION CALENDAR
May 1, 2018

To: Honorable Mayor and Members of the City Council

From: Councilmember Ben Bartlett

Subject: Berkeley Microbond Blockchain Initiative – Pilot Project

RECOMMENDATION

Refer to the City Manager to implement a Pilot Project for the Berkeley Microbond Blockchain Initiative. The specific Pilot Project should be selected by the Berkeley City Council at the April 24, 2018 meeting.

BACKGROUND

The Berkeley Microbond Blockchain Initiative seeks to allow community members in Berkeley to invest directly in the public projects they care about. The Project intends to achieve this goal through crowdfunded municipal microbonds secured by a blockchain-based system. This builds off of Berkeley's legacy of innovative financing, including Property Assessed Clean Energy (PACE).

Crowdfunding Municipal Microbonds

Municipal bonds (also known as “muni bonds” or “munis”) are debt securities issued by governmental entities to fund day-to-day obligations and to finance capital projects. Muni bonds are a way for cities, states, and other government entities to fund projects that are vital for communities, such as schools, roads, and parks.

Historically, in the 19th and early 20th centuries, muni bonds were more accessible, and were purchased by local people investing in their own communities. For instance, in the 1930s, San Francisco's Golden Gate Bridge was financed by muni bonds purchased mostly by the public, who used their homes, farms, and businesses as collateral.¹

¹ Richards, Sam. “How the Golden Gate Bridge Was Built: A Muni Bond Success Story.” *Neighborly*, Neighborly, 6 Nov. 2015, neighborly.com/learn/how-the-golden-gate-bridge-was-built/.

Today, however, regular people are far removed from the muni bond market. The \$3.7 trillion muni market lacks transparency, involves a slew of fee-collecting middle men, is controlled by Wall Street, and excludes small investors.

Municipalities and other governmental entities sell their bonds to bank underwriters (such as Goldman Sachs and Wells Fargo). The underwriters then resell the bonds to brokers and big institutions. Bonds can go through many intermediaries before reaching an end investor. Each time a bond changes hands, its price may be marked up. Bond dealers are not required to disclose their fees, charges, or markups.

“A 2012 report by the Government Accountability Office concluded that smaller investors were likely to pay higher prices to buy, and receive lower returns when they sell. The Securities Litigation and Consulting Group, a consulting firm, estimates the cost of excessive markups to small investors at \$1 billion a year.”²

Research by the Haas Institute for a Fair and Inclusive Society suggests that “municipal bond issuers face upwards of \$4 billion of issuance costs annually. This represents taxpayer and ratepayer money diverted from infrastructure development and service provision to a variety of financial industry interests.”³

Typically, muni bonds have a minimum denomination⁴ of \$5,000, because of the enormous expense associated with issuing bonds. Some issuers even impose higher denominations (most commonly \$100,000). This makes it impossible for most small investors to purchase muni bonds.

By combining civic crowdfunding with municipal “microbonds,” we can democratize public financing in Berkeley and create tangible benefits for our community.

A “microbond” or a “minibond” are terms for a municipal bond that is offered in smaller, more affordable increments. Essentially, a bond with a lower minimum denomination. By crowdfunding microbonds, cities and other governmental entities can cut out unnecessary middlemen and markups, by selling bonds directly to investors at lower costs. The lower costs can increase access for small investors. This simplified process can also increase transparency.

A few other cities have already had success with crowdfunding microbonds, most notably the City of Cambridge and the City of Denver.

² Cortese, Amy. “Putting the Public Back in Public Finance.” *The New York Times*, The New York Times, 10 July 2015, www.nytimes.com/2015/07/12/business/mutfund/putting-the-public-back-in-public-finance.html.

³ Joffe, Marc. “Doubly Bound: The Costs of Issuing Municipal Bonds.” *Haas Institute*, Haas Institute for a Fair and Inclusive Society, 1 Apr. 1970, haasinstitute.berkeley.edu/doubly-bound-costs-issuing-municipal-bonds.

⁴ A minimum denomination is the smallest increment you can buy a bond.

In February 2017, the City of Cambridge first offered \$2 million of microbonds with a minimum denomination of \$1,000. The bonds funded city-wide capital projects including school building renovations, municipal facility upgrades, and street improvements. The City of Cambridge received national recognition for this bond offering, including winning a 2017 Deal of the Year award by The Bond Buyer.⁵ Cambridge issued a second microbond offering in February 2018.

In 2014, the City of Denver offered \$12 million of microbonds with a minimum denomination of \$500. The bonds sold out in just one hour and were used to fund the maintenance of roads and civic buildings.⁶

In summary, we believe that crowdfunding muni microbonds can achieve the following benefits:

- **Increase Accessibility.** For most municipal bond investments, investors need to invest \$5,000 or more. We want to lower this cost so that everyone can be able to invest in and improve communities. Moreover, this is an equity issue. Muni bonds are a considerable financial investment opportunity for wealth building that is currently only accessible to mutual funds and high net worth individuals. We believe that it is our civic responsibility to ensure that everyone can invest in their community and share in the upside.
- **Increase Transparency.** By selling bonds directly to investors, we simplify the process of bond issuance by cutting out unknown middlemen and markups. Investors can see exactly where their money is going, and the exact impact their funds will have on our community.
- **Increase Flexibility.** Because of the expense associated with bond issuance, government entities generally only issue large bonds (such as our \$100 million T1 bond to improve City infrastructure). By cutting costs and removing middlemen, we can increase flexibility in the targeting of projects, allowing us to issue bonds for smaller projects, such as a fire truck or one homeless facility.
- **Increase Speed.** This technology allows capital to be raised and deployed much more quickly than traditional approaches.

⁵ City of Cambridge. "Cambridge Wins 2017 Deal of the Year Award for Minibond Program." *City of Cambridge, MA*, City of Cambridge, MA, 27 Nov. 2017, www.cambridgema.gov/news/2017/11/cambridgewinsawardforminibondprogram.

⁶ Murray, Jon. "Denver's \$500 'Mini-Bonds' Sell out in First Hour, Raising \$12 Million." *The Denver Post*, The Denver Post, 27 Apr. 2016, www.denverpost.com/2014/08/04/denvers-500-mini-bonds-sell-out-in-first-hour-raising-12-million/.

- **Build Community.** By offering these civic microbonds, we will be giving community members a chance to invest in our local community and to help shape our community for a brighter future.

Why Blockchain Technology?

The Berkeley Microbond Blockchain Initiative proposes to allow investors to purchase municipal microbonds secured by a blockchain-based, smart-contract system.

“[B]lockchain is an open, distributed ledger that can record transactions between... parties efficiently and in a verifiable and permanent way. The ledger itself can also be programmed to trigger transactions automatically.”⁷ On its most fundamental level, blockchain is a digital ledger, “a recordkeeping system that keeps track of any type of transaction.”⁸

Blockchain has following valuable characteristics:

Reliability and Availability. Blockchain involves a shared and continuously reconciled database, which is distributed among a wide circle of participants. “It has no single point of failure and is designed to be resilient in the face of outages or attacks. If any node in a network of participants fails, the others will continue to operate, maintaining the information’s availability and reliability.

Transparent. Transactions on the blockchain are visible to its participants, increasing auditability and trust.

Immutable. It is nearly impossible to make changes to a blockchain without detection, increasing confidence in the information it carries and reducing the opportunities for fraud.

Irrevocable. It is possible to make transactions irrevocable, which can increase the accuracy of records and simplify back-office processes.”⁹

Blockchain has the potential to improve public sector performance, particularly where existing practices are costly, slow, or unreliable. “[A]gencies in more than a dozen countries—including Canada, the United Kingdom, Brazil, China, and India—are running pilots, tests, and trials examining both the architecture’s broad utility as a basis for

⁷ Iansiti, Marco, and Karim R. Lakhani. “The Truth About Blockchain.” *Harvard Business Review*, Harvard Business Review, 6 Mar. 2018, hbr.org/2017/01/the-truth-about-blockchain.

⁸ Carmichael, Sarah Green, and Karim Lakhani. “Blockchain - What You Need to Know.” *Harvard Business Review*, Harvard Business Review, 15 June 2017, hbr.org/ideacast/2017/06/blockchain-what-you-need-to-know. Accessed 9 Apr. 2018.

⁹ Muraskin, Craig, and David Schatsky. “Beyond Bitcoin.” *Deloitte Insights*, 7 Dec. 2015, www2.deloitte.com/insights/us/en/focus/signals-for-strategists/trends-blockchain-bitcoin-security-transparency.html.

government service provision and procurement and developing individual blockchain-based applications for internal use.”¹⁰

In the United Arab Emirates, “the government is exploring a wide range of use cases, including for business registration logistics, and central bank operations.”¹¹

In the United States, the state of Delaware, where many businesses are incorporated, launched a Delaware Blockchain Initiative. The initiative seeks to address operational and legal challenges facing corporations.¹²

“Elsewhere in the United States, several federal agencies—including the General Services Administration, the Department of Homeland Security, and the Health and Human Services Department—have announced blockchain programs. New York, Illinois, and Texas are among the states that are piloting and/or testing blockchain applications.”¹³

Through the Berkeley Microbond Blockchain Initiative, we seek to bring the benefits of blockchain – security, efficiency, affordability, and speed – to our City’s public financing. Blockchain will be used to record bonds and their transactions, including the ownership of every bond at any given time. As soon as bonds are issued, the blockchain ledger will keep track of everything in real-time.

The Pilot Project

The City of Berkeley should implement a pilot project, to be selected by the Berkeley City Council, for the Berkeley Microbond Blockchain Initiative. Potential options for pilot projects include funding a fire truck, funding prefabricated housing for the homeless, public art, and more.

FINANCIAL IMPLICATIONS

Staff time.

ENVIRONMENTAL SUSTAINABILITY

No adverse effects to the environment.

CONTACT

¹⁰ Muraskin, Craig, and David Schatsky. “Beyond Bitcoin.” *Deloitte Insights*, 7 Dec. 2015, www2.deloitte.com/insights/us/en/focus/signals-for-strategists/trends-blockchain-bitcoin-security-transparency.html.

¹¹ Muraskin, Craig, and David Schatsky. “Beyond Bitcoin.” *Deloitte Insights*, 7 Dec. 2015, www2.deloitte.com/insights/us/en/focus/signals-for-strategists/trends-blockchain-bitcoin-security-transparency.html.

¹² Say, My. “Why The Delaware Blockchain Initiative Matters To All Dealmakers.” *Forbes*, Forbes Magazine, 20 Sept. 2017, www.forbes.com/sites/groupthink/2017/09/20/why-the-delaware-blockchain-initiative-matters-to-all-dealmakers/#35c27a9b7550.

¹³ Muraskin, Craig, and David Schatsky. “Beyond Bitcoin.” *Deloitte Insights*, 7 Dec. 2015, www2.deloitte.com/insights/us/en/focus/signals-for-strategists/trends-blockchain-bitcoin-security-transparency.html.

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