

ROYAL BANK OF CANADA  
Form 424B2  
August 03, 2017

RBC Capital Markets® Filed Pursuant to Rule 424(b)(2)  
Registration Statement No. 333-208507

#### Pricing Supplement

Dated August 1, 2017 \$1,290,000  
To the Product Auto-Callable Contingent Coupon Barrier Notes  
Prospectus Supplement Linked to the Lesser Performing of One Exchange  
No. TP-1, the Prospectus Traded Fund and One Equity Index,  
Supplement and the Due August 6, 2020  
Prospectus, Each Dated Royal Bank of Canada  
January 8, 2016

Royal Bank of Canada is offering Auto-Callable Contingent Coupon Barrier Notes (the “Notes”) linked to the lesser performing of one exchange traded fund and one equity index (each, a “Reference Asset” and collectively, the “Reference Assets”). The Notes offered are senior unsecured obligations of Royal Bank of Canada, will pay a quarterly Contingent Coupon at the rate and under the circumstances specified below, and will have the terms described in the documents described above, as supplemented or modified by this pricing supplement. The Notes will not be listed on any securities exchange.

| Reference Assets               | Initial Levels <sup>(1)</sup> | Coupon Barriers and Trigger Levels <sup>(2)</sup> |
|--------------------------------|-------------------------------|---|
| SPDR® S&P® Biotech ETF (“XBI”) | \$77.09                       | \$47.02, which is 61.00% of its Initial Level     |
| S&P 500® Index (“SPX”)         | 2,476.35                      | 1,510.57, which is 61.00% of its Initial Level    |

<sup>(1)</sup> For the XBI, the Initial Level was its closing price, and for the SPX, its closing level, on the Trade Date.

<sup>(2)</sup> Rounded to two decimal places.

The Notes do not guarantee any return of principal at maturity. Any payments on the Notes are subject to our credit risk.

Investing in the Notes involves a number of risks. See “Risk Factors” beginning on page PS-5 of the product prospectus supplement dated January 8, 2016, on page S-1 of the prospectus supplement dated January 8, 2016, and “Selected Risk Considerations” beginning on page P-7 of this pricing supplement.

The Notes will not constitute deposits insured by the Canada Deposit Insurance Corporation, the U.S. Federal Deposit Insurance Corporation or any other Canadian or U.S. government agency or instrumentality.

Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of the Notes or determined that this pricing supplement is truthful or complete. Any representation to the contrary is a criminal offense.

|                    |                                |                         |                               |
|--------------------|--------------------------------|-------------------------|-------------------------------|
| Issuer:            | Royal Bank of Canada           | Listing:                | None                          |
| Trade Date:        | August 1, 2017                 | Principal Amount:       | \$1,000 per Note              |
| Issue Date:        | August 4, 2017                 | Maturity Date:          | August 6, 2020                |
| Observation Dates: | Quarterly, as set forth below. | Coupon Payment Dates:   | Quarterly, as set forth below |
| Valuation Date:    | August 3, 2020                 | Contingent Coupon Rate: | 8.00% per annum               |

If the Observation Level of each Reference Asset is greater than or equal to its Coupon Barrier on the applicable Observation Date, we will pay the Contingent Coupon applicable to the corresponding Observation Date. You may not receive any Contingent Coupons during the term of the Notes.

Payment at Maturity (if held

to maturity): If the Notes are not previously called, we will pay you at maturity an amount based on the Final Level of the Lesser Performing Reference Asset:  
 For each \$1,000 in principal amount, \$1,000 plus the Contingent Coupon at maturity, unless the Final Level of the Lesser Performing Reference Asset is less than its Trigger Level.  
 If the Final Level of the Lesser Performing Reference Asset is less than its Trigger Level, then the investor will receive at maturity, for each \$1,000 in principal amount, a cash payment equal to:  
 $\$1,000 + (\$1,000 \times \text{Reference Asset Return of the Lesser Performing Reference Asset})$   
 Investors in the Notes could lose some or all of their principal amount if the Final Level of the Lesser Performing Reference Asset below its Trigger Level.  
 Lesser Performing Reference Asset: The Reference Asset with the largest percentage decrease between its Initial Level and its Final Level.  
 Call Feature: If the Observation Level of each Reference Asset is greater than or equal to its Initial Level starting on any Observation Date on or after August 1, 2018, the Notes will be automatically called for 100% of their principal amount, plus the Contingent Coupon applicable to the corresponding Observation Date.  
 Call Settlement Dates: The Coupon Payment Date corresponding to that Observation Date.  
 Observation Level: For the XBI, its closing price, and for the SPX, its closing level, on any Observation Date.  
 Final Level: For the XBI, its closing price, and for the SPX, its closing level, on the Valuation Date.  
 CUSIP: 78012K3P0

|  | Per Note | Total          |
|--|----------|----------------|
| Price to public                        | 100.00%  | \$1,290,000.00 |
| Underwriting discounts and commissions | 0.65%    | \$8,385.00     |
| Proceeds to Royal Bank of Canada       | 99.35%   | 1,281,615.00   |

The initial estimated value of the Notes as of the date of this pricing supplement is \$979.60 per \$1,000 in principal amount, which is less than the price to public. The actual value of the Notes at any time will reflect many factors, cannot be predicted with accuracy, and may be less than this amount. We describe our determination of the initial estimated value in more detail below.

RBC Capital Markets, LLC, which we refer to as RBCCM, acting as agent for Royal Bank of Canada, received a commission of \$6.50 per \$1,000 in principal amount of the Notes and used a portion of that commission to allow selling concessions to other dealers of up to \$6.50 per \$1,000 in principal amount of the Notes. The other dealers may forgo, in their sole discretion, some or all of their selling concessions. See “Supplemental Plan of Distribution (Conflicts of Interest)” below.

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Auto-Callable Contingent Coupon Barrier Notes  
 Linked to the Lesser Performing of One  
 Exchange Traded Fund and One Equity Index,  
 Due August 6, 2020

**SUMMARY**

The information in this “Summary” section is qualified by the more detailed information set forth in this pricing supplement, the product prospectus supplement, the prospectus supplement, and the prospectus.

This pricing supplement relates to an offering of Auto-Callable Contingent Coupon Barrier Notes (the “Notes”) linked to the lesser performing of the following (each, a “Reference Asset”, and collectively, the “Reference Assets”):

**General:** (i) the shares of SPDR® S&P® Biotech ETF (the “XBI”); and  
 (ii) the S&P 500® Index (the “SPX”);  
 See “Additional Terms of your Notes Related to Indices” below, which relates to the SPX.

**Issuer:** Royal Bank of Canada (“Royal Bank”)  
**Issue:** Senior Global Medium-Term Notes, Series G  
**Trade Date:** August 1, 2017  
**Issue Date:** August 4, 2017  
**Term:** Three (3) years  
**Denominations:** Minimum denomination of \$1,000, and integral multiples of \$1,000 thereafter.  
**Designated Currency:** U.S. Dollars

We will pay you a Contingent Coupon during the term of the Notes, periodically in arrears on each Coupon Payment Date, under the conditions described below:

- If the Observation Level of each Reference Asset is greater than or equal to its Coupon Barrier on the applicable Observation Date, we will pay the Contingent Coupon applicable to that Observation Date.
- If the Observation Level of any Reference Asset is less than its Coupon Barrier on the applicable Observation Date, we will not pay you the Contingent Coupon applicable to that Observation Date.

You may not receive a Contingent Coupon for one or more quarterly periods during the term of the Notes.

**Contingent Coupon Rate:** 8.00% per annum (2.00% per quarter)  
**Observation Dates:** Quarterly on November 1, 2017, February 1, 2018, May 1, 2018, August 1, 2018, November 1, 2018, February 1, 2019, May 1, 2019, August 1, 2019, November 1, 2019, February 3, 2020, May 1, 2020, and the Valuation Date.

**Coupon Payment Dates:** The Contingent Coupon, if applicable, will be paid quarterly on November 6, 2017, February 6, 2018, May 4, 2018, August 6, 2018, November 6, 2018, February 6, 2019, May 6, 2019, August 6, 2019, November 6, 2019, February 6, 2020, May 6, 2020 and the Maturity Date.

**Record Dates:** The record date for each Coupon Payment Date will be the date one business day prior to that scheduled Coupon Payment Date; provided, however, that any Contingent Coupon payable at maturity or upon a call will be payable to the person to whom the payment at maturity or upon the call, as the case may be, will be payable.

**Call Feature:** If, starting on August 1, 2018 and on any Observation Date thereafter, the Observation Level of each Reference Asset is greater than or equal to its Initial Level, then the Notes will be automatically called.

**Payment if Called:**

If the Notes are automatically called, then, on the applicable Call Settlement Date, for each \$1,000 principal amount, you will receive \$1,000 plus the Contingent Coupon otherwise due on that Call Settlement Date.

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Call Settlement Dates: If, starting on August 1, 2018, the Notes are called on any Observation Date, the Call Settlement Date will be the Coupon Payment Date corresponding to that Observation Date.

Valuation Date: August 3, 2020

Maturity Date: August 6, 2020

Initial Level: For the XBI, its closing price, and for the SPX, its closing level, on the Trade Date, as specified on the cover page of this pricing supplement.

Final Level: For the XBI, its closing price, and for the SPX, its closing level, on the Valuation Date.

Observation Level: For the XBI, its closing price, and for the SPX, its closing level, on any Observation Date.

Trigger Level and Coupon Barrier: For each Reference Asset, 61.00% of its Initial Level.

If the Notes are not previously called, we will pay you at maturity an amount based on the Final Level of the Lesser Performing Reference Asset:

Payment at Maturity (if not previously called and held to maturity):

- If the Final Level of the Lesser Performing Reference Asset is greater than or equal to its Trigger Level, we will pay you a cash payment equal to the principal amount plus the Contingent Coupon otherwise due on the Maturity Date.
- If the Final Level of the Lesser Performing Reference Asset is less than its Trigger Level, you will receive at maturity, for each \$1,000 in principal amount, a cash payment equal to:  $\$1,000 + (\$1,000 \times \text{Reference Asset Return of the Lesser Performing Reference Asset})$

The amount of cash that you receive will be less than your principal amount, if anything, resulting in a loss that is proportionate to the decline of the Lesser Performing Reference Asset from the Trade Date to the Valuation Date. Investors in the Notes could lose some or all of their principal amount if the Final Level of the Lesser Performing Reference Asset below its Trigger Level.

Stock Settlement: Not applicable. Payments on the Notes will be made solely in cash.

Reference Asset Return: With respect to each Reference Asset:  
Final Level – Initial Level  
 Initial Level

Lesser Performing Reference Asset: The Reference Asset with the largest percentage decrease between its Initial Level and its Final Level.

Market Disruption Events: The occurrence of a market disruption event (or a non-trading day) as to any of the Reference Assets will result in the postponement of an Observation Date or the Valuation Date as to that Reference Asset, as described in the product prospectus supplement, but not to any non-affected Reference Asset.

Calculation Agent: RBC Capital Markets, LLC (“RBCCM”)

U.S. Tax Treatment: By purchasing a Note, each holder agrees (in the absence of a change in law, an administrative determination or a judicial ruling to the contrary) to treat the Note as a callable pre-paid cash-settled contingent income-bearing derivative contract linked to the Reference Assets for U.S. federal income tax purposes. However, the U.S. federal income tax consequences of your investment in the Notes are uncertain and the Internal Revenue Service could assert that the Notes should be taxed in a manner that is different from that described in the preceding sentence. Please see the section below, “Supplemental Discussion of U.S. Federal Income Tax Consequences,” and the discussion (including the opinion of our counsel Morrison & Foerster LLP) in the product prospectus supplement dated January 8, 2016 under “Supplemental Discussion of U.S. Federal Income Tax Consequences,” which apply to the Notes.

Secondary Market: RBCCM (or one of its affiliates), though not obligated to do so, may maintain a secondary market in the Notes after the Issue Date. The amount that you may receive upon sale of your Notes prior to maturity may be less than the principal amount.

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Auto-Callable Contingent Coupon Barrier Notes  
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Due August 6, 2020

Listing: The Notes will not be listed on any securities exchange.  
DTC global (including through its indirect participants Euroclear and Clearstream, Luxembourg as  
Settlement: described under “Description of Debt Securities—Ownership and Book-Entry Issuance” in the prospectus  
dated January 8, 2016).  
Terms All of the terms appearing above the item captioned “Secondary Market” on the cover page and pages  
Incorporated in P-2 and P-3 of this pricing supplement and the terms appearing under the caption “General Terms of  
the Master the Notes” in the product prospectus supplement dated January 8, 2016, as modified by this pricing  
Note: supplement.

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Auto-Callable Contingent Coupon Barrier Notes  
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#### ADDITIONAL TERMS OF YOUR NOTES

You should read this pricing supplement together with the prospectus dated January 8, 2016, as supplemented by the prospectus supplement dated January 8, 2016 and the product prospectus supplement dated January 8, 2016, relating to our Senior Global Medium-Term Notes, Series G, of which these Notes are a part. Capitalized terms used but not defined in this pricing supplement will have the meanings given to them in the product prospectus supplement. In the event of any conflict, this pricing supplement will control. The Notes vary from the terms described in the product prospectus supplement in several important ways. You should read this pricing supplement carefully, including “- Additional Terms Relating to Indices” below, which relate to the SPX.

This pricing supplement, together with the documents listed below, contains the terms of the Notes and supersedes all prior or contemporaneous oral statements as well as any other written materials including preliminary or indicative pricing terms, correspondence, trade ideas, structures for implementation, sample structures, brochures or other educational materials of ours. You should carefully consider, among other things, the matters set forth in “Risk Factors” in the prospectus supplement dated January 8, 2016 and in the product prospectus supplement dated January 8, 2016, as the Notes involve risks not associated with conventional debt securities. We urge you to consult your investment, legal, tax, accounting and other advisors before you invest in the Notes. You may access these documents on the Securities and Exchange Commission (the “SEC”) website at [www.sec.gov](http://www.sec.gov) as follows (or if that address has changed, by reviewing our filings for the relevant date on the SEC website):

Prospectus dated January 8, 2016:

<http://www.sec.gov/Archives/edgar/data/1000275/000121465916008810/j18160424b3.htm>

Prospectus Supplement dated January 8, 2016:

<http://www.sec.gov/Archives/edgar/data/1000275/000121465916008811/p14150424b3.htm>

Product Prospectus Supplement dated January 8, 2016:

<https://www.sec.gov/Archives/edgar/data/1000275/000114036116047446/form424b5.htm>

Our Central Index Key, or CIK, on the SEC website is 1000275. As used in this pricing supplement, “we,” “us,” or “our” refers to Royal Bank of Canada.

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Auto-Callable Contingent Coupon Barrier Notes  
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#### HYPOTHETICAL EXAMPLES

The table set out below is included for illustration purposes only. The table illustrates the Payment at Maturity of the Notes (including the final Contingent Coupon, if payable) for a hypothetical range of performance for the Lesser Performing Reference Asset, assuming the following terms and that the Notes are not automatically called prior to maturity:

|                                   |  |
|-----------------------------------|--|
| Trigger Level and Coupon Barrier: | 61.00% of the Initial Level of the Lesser Performing Reference Asset |
| Contingent Coupon Rate:           | 8.00% per annum (or 2.00% per quarter)                               |
| Contingent Coupon Amount:         | \$20.00 per quarter  |
| Observation Dates:                | Quarterly  |
| Principal Amount:                 | \$1,000 per Note   |

We make no representation or warranty as to which of the Reference Assets will be the Lesser Performing Reference Asset. It is possible that the Final Level of each Reference Asset will be less than its Initial Level.

Hypothetical Final Levels of the Lesser Performing Reference Asset, expressed as a percentage of its Initial Level, are shown in the first column on the left. The second column shows the Payment at Maturity for a range of Reference Asset Returns on the Valuation Date. The third column shows the amount of cash to be paid on the Notes per \$1,000 in principal amount. If the Notes are called prior to maturity, the hypothetical examples below will not be relevant, and you will receive on the applicable Coupon Payment Date, for each \$1,000 principal amount, \$1,000 plus the Contingent Coupon otherwise due on the Notes.

| Final Level of the Lesser Performing Reference Asset (%) | Payment at Maturity as Percentage of Principal Amount | Cash Payment Amount per \$1,000 in Principal Amount |
|--|---|---|
| 150.00%  | 102.00%*  | \$1,020.00*   |
| 140.00%  | 102.00%*  | \$1,020.00*   |
| 130.00%  | 102.00%*  | \$1,020.00*   |
| 120.00%  | 102.00%*  | \$1,020.00*   |
| 110.00%  | 102.00%*  | \$1,020.00*   |
| 100.00%  | 102.00%*  | \$1,020.00*   |
| 90.00%   | 102.00%*  | \$1,020.00*   |
| 80.00%   | 102.00%*  | \$1,020.00*   |
| 70.00%   | 102.00%*  | \$1,020.00*   |
| 61.00%   | 102.00%*  | \$1,020.00*   |
| 60.99%   | 60.99%  | \$600.99  |
| 55.00%   | 55.00%  | \$550.00  |
| 50.00%   | 50.00%  | \$500.00  |
| 40.00%   | 40.00%  | \$400.00  |
| 25.00%   | 25.00%  | \$250.00  |
| 0.00%  | 0.00%   | \$0.00  |

\*Including the final Contingent Coupon, if payable.

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Auto-Callable Contingent Coupon Barrier Notes  
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Hypothetical Examples of Amounts Payable at Maturity

The following hypothetical examples illustrate how the payments at maturity set forth in the table above are calculated, assuming the Notes have not been called.

Example 1: The Final Level of the Lesser Performing Reference Asset is 120%, an increase of 20% from its Initial Level. Because the Final Level of the Lesser Performing Reference Asset is greater than its Trigger Level of 61.00%, the investor receives at maturity, in addition to the final Contingent Coupon of \$20.00 otherwise due on the Notes, a cash payment of \$1,000 per Note, despite the 20% appreciation in the value of the Lesser Performing Reference Asset.

Example 2: The Final Level of the Lesser Performing Reference Asset is 90.00%, a decrease of 10% from its Initial Level. Because the Final Level of the Lesser Performing Reference Asset is greater than its Trigger Level of 61.00%, the investor receives at maturity, in addition to the final Contingent Coupon of \$20.00 otherwise due on the Notes, a cash payment of \$1,000 per Note, despite the 10% decline in the value of the Lesser Performing Reference Asset.

Example 3: The Final Level of the Lesser Performing Reference Asset is 50.00% on the Valuation Date, which is less than its Trigger Level of 61.00%. Because the Final Level of the Lesser Performing Reference Asset is less than its Trigger Level, the final Contingent Coupon will not be payable on the Maturity Date, and we will pay only \$500.00 for each \$1,000 in the principal amount of the Notes, calculated as follows:

Principal Amount + (Principal Amount x Reference Asset Return of the Lesser Performing Reference Asset)  
= \$1,000 + (\$1,000 x -50.00%) = \$1,000 - \$500.00 = \$500.00

\* \* \*

The Payments at Maturity shown above are entirely hypothetical; they are based on values of the Reference Assets that may not be achieved on the Valuation Date and on assumptions that may prove to be erroneous. The actual market value of your Notes on the Maturity Date or at any other time, including any time you may wish to sell your Notes, may bear little relation to the hypothetical Payments at Maturity shown above, and those amounts should not be viewed as an indication of the financial return on an investment in the Notes or on an investment in any Reference Asset or the securities included in any of the Reference Assets.

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Auto-Callable Contingent Coupon Barrier Notes  
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#### SELECTED RISK CONSIDERATIONS

An investment in the Notes involves significant risks. Investing in the Notes is not equivalent to investing directly in the Reference Assets. These risks are explained in more detail in the section “Risk Factors” in the product prospectus supplement. In addition to the risks described in the prospectus supplement and the product prospectus supplement, you should consider the following:

**Principal at Risk** — Investors in the Notes could lose all or a substantial portion of their principal amount if there is a decline in the value of the Lesser Performing Reference Asset between the Trade Date and the Valuation Date. If the Notes are not automatically called and the Final Level of the Lesser Performing Reference Asset on the Valuation Date is less than its Trigger Level, the amount of cash that you receive at maturity will represent a loss of your principal that is proportionate to the decline in the closing price or closing level, as applicable, of the Lesser Performing Reference Asset from the Trade Date to the Valuation Date. Any Contingent Coupons received on the Notes prior to the Maturity Date may not be sufficient to compensate for any such loss.

**The Notes Are Subject to an Automatic Call** — If on any Observation Date (other than the Valuation Date) on or after August 1, 2018, the Observation Level of each Reference Asset is greater than or equal to its Initial Level, then the Notes will be automatically called. If the Notes are automatically called, then, on the applicable Call Settlement Date, for each \$1,000 in principal amount, you will receive \$1,000 plus the Contingent Coupon otherwise due on the applicable Call Settlement Date. You will not receive any Contingent Coupons after the Call Settlement Date. You may be unable to reinvest your proceeds from the automatic call in an investment with a return that is as high as the return on the Notes would have been if they had not been called.

**You May Not Receive Any Contingent Coupons** — We will not necessarily make any coupon payments on the Notes. If the Observation Level of any of the Reference Assets on an Observation Date is less than its Coupon Barrier, we will not pay you the Contingent Coupon applicable to that Observation Date. If the Observation Level of any of the Reference Assets is less than its Coupon Barrier on each of the Observation Dates and on the Valuation Date, we will not pay you any Contingent Coupons during the term of, and you will not receive a positive return on your Notes. Generally, this non-payment of the Contingent Coupon coincides with a period of greater risk of principal loss on your Notes. Accordingly, if we do not pay the Contingent Coupon on the Maturity Date, you will also incur a loss of principal, because the Final Level of the Lesser Performing Reference Asset will be less than its Trigger Level.

**The Notes Are Linked to the Lesser Performing Reference Asset, Even if the Other Reference Assets Perform Better** — If any of the Reference Assets has a Final Level that is less than its Trigger Level, your return will be linked to the lesser performing of the three Reference Assets. Even if the Final Levels of the other Reference Assets have increased compared to their respective Initial Levels, or have experienced a decrease that is less than that of the Lesser Performing Reference Asset, your return will only be determined by reference to the performance of the Lesser Performing Reference Asset, regardless of the performance of the other Reference Assets.

**Your Payment on the Notes Will Be Determined by Reference to Each Reference Asset Individually, Not to a Basket, and the Payment at Maturity Will Be Based on the Performance of the Lesser Performing Reference Asset** — The Payment at Maturity will be determined only by reference to the performance of the Lesser Performing Reference Asset, regardless of the performance of the other Reference Assets. The Notes are not linked to a weighted basket, in which the risk may be mitigated and diversified among each of the basket components. For example, in the case of notes linked to a weighted basket, the return would depend on the weighted aggregate performance of the basket components reflected as the basket return. As a result, the depreciation of one basket component could be mitigated by the appreciation of the other basket components, as scaled by the weighting of that basket component. However, in the case of the Notes, the individual performance of each of the Reference Assets would not be combined, and the depreciation of one Reference Asset would not be mitigated by any appreciation of the other Reference Assets.

Instead, your return will depend solely on the Final Level of the Lesser Performing Reference Asset.

**The Call Feature and the Contingent Coupon Feature Limit Your Potential Return** — The return potential of the Notes is limited to the pre-specified Contingent Coupon Rate, regardless of the appreciation of the Reference Assets. In addition, the total return on the Notes will vary based on the number of Observation Dates on which the Contingent Coupon becomes payable prior to maturity or an automatic call. Further, if the Notes are called due to the Call Feature, you will not receive any Contingent Coupons or any other payment in respect of any Observation Dates after the applicable Call Settlement Date. Since the Notes could be called as early as August 2018, the total return on the Notes could be limited to one year of Contingent Coupons, none of which are guaranteed. If the Notes are not called, you may be subject to the full downside performance of the Lesser Performing Reference Asset even though your potential return is limited to the Contingent Coupon Rate. As a result, the return on an investment in the Notes could be less than the return on a direct investment in the Reference Assets.

**Your Return May Be Lower than the Return on a Conventional Debt Security of Comparable Maturity** — The return that you will receive on the Notes, which could be negative, may be less than the return you could earn on other investments. Even if

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your return is positive, your return may be less than the return you would earn if you bought a conventional senior interest bearing debt security of Royal Bank.

**Payments on the Notes Are Subject to Our Credit Risk, and Changes in Our Credit Ratings Are Expected to Affect the Market Value of the Notes** — The Notes are Royal Bank's senior unsecured debt securities. As a result, your receipt of any Contingent Coupons, if payable, and the amount due on any relevant payment date is dependent upon Royal Bank's ability to repay its obligations on the applicable payment dates. This will be the case even if the values of the Reference Assets increase after the Trade Date. No assurance can be given as to what our financial condition will be during the term of the Notes.

**There May Not Be an Active Trading Market for the Notes-Sales in the Secondary Market May Result in Significant Losses** — There may be little or no secondary market for the Notes. The Notes will not be listed on any securities exchange. RBCCM and other affiliates of Royal Bank may make a market for the Notes; however, they are not required to do so. RBCCM or any other affiliate of Royal Bank may stop any market-making activities at any time. Even if a secondary market for the Notes develops, it may not provide significant liquidity or trade at prices advantageous to you. We expect that transaction costs in any secondary market would be high. As a result, the difference between bid and asked prices for your Notes in any secondary market could be substantial.

**The Initial Estimated Value of the Notes Is Less than the Price to the Public** — The initial estimated value set forth on the cover page of this pricing supplement does not represent a minimum price at which we, RBCCM or any of our affiliates would be willing to purchase the Notes in any secondary market (if any exists) at any time. If you attempt to sell the Notes prior to maturity, their market value may be lower than the price you paid for them and the initial estimated value. This is due to, among other things, changes in the prices or levels of the Reference Assets, the borrowing rate we pay to issue securities of this kind, and the inclusion in the price to the public of the underwriting discount and the estimated costs relating to our hedging of the Notes. These factors, together with various credit, market and economic factors over the term of the Notes, are expected to reduce the price at which you may be able to sell the Notes in any secondary market and will affect the value of the Notes in complex and unpredictable ways.

Assuming no change in market conditions or any other relevant factors, the price, if any, at which you may be able to sell your Notes prior to maturity may be less than your original purchase price, as any such sale price would not be expected to include the underwriting discount and the hedging costs relating to the Notes. In addition to bid-ask spreads, the value of the Notes determined by RBCCM for any secondary market price is expected to be based on the secondary rate rather than the internal funding rate used to price the Notes and determine the initial estimated value.

As a result, the secondary price will be less than if the internal funding rate was used. The Notes are not designed to be short-term trading instruments. Accordingly, you should be able and willing to hold your Notes to maturity.

**The Initial Estimated Value of the Notes on the Cover Page of this Pricing Supplement Is an Estimate Only, Calculated as of the Time the Terms of the Notes Were Set** — The initial estimated value of the Notes is based on the value of our obligation to make the payments on the Notes, together with the mid-market value of the derivative embedded in the terms of the Notes. See "Structuring the Notes" below. Our estimate is based on a variety of assumptions, including our credit spreads, expectations as to dividends, interest rates and volatility, and the expected term of the Notes. These assumptions are based on certain forecasts about future events, which may prove to be incorrect. Other entities may value the Notes or similar securities at a price that is significantly different than we do. The value of the Notes at any time after the Trade Date will vary based on many factors, including changes in market conditions, and cannot be predicted with accuracy. As a result, the actual value you would receive if you sold the Notes in any secondary market, if any, should be expected to differ materially from the initial estimated value of your Notes.

Market Disruption Events and Adjustments — The payment at maturity, each Observation Date and the Valuation Date are subject to adjustment as described in the product prospectus supplement. For a description of what constitutes a market disruption event as well as the consequences of that market disruption event, see “General Terms of the Notes—Market Disruption Events” in the product prospectus supplement.

Owning the Notes Is Not the Same as Owning the XBI or the Securities Represented by the SPX — The return on your Notes is unlikely to reflect the return you would realize if you actually owned shares of the XBI or the securities represented by the SPX. For instance, you will not receive or be entitled to receive any dividend payments or other distributions on these securities during the term of your Notes. As an owner of the Notes, you will not have voting rights or any other rights that holders of these securities may have. Furthermore, the Reference Assets may appreciate substantially during the term of the Notes, while your potential return will be limited to the applicable Contingent Coupon payments.

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Prior to Maturity, the Value of the Notes Will Be Influenced by Many Unpredictable Factors — Many economic and market factors will influence the value of the Notes. We expect that, generally, the price or level of each Reference Asset on any day will affect the value of the Notes more than any other single factor. However, you should not expect the value of the Notes in the secondary market to vary in proportion to changes in the value of the Reference Assets. The value of the Notes will be affected by a number of other factors that may either offset or magnify each other, including:

- Ø the market value of the Reference Assets;
- Ø whether the market value of one or more of the Reference Assets is below the Coupon Barrier or the Trigger Level;
- Ø the expected volatility of the Reference Assets;
- Ø the time to maturity of the Notes;
- Ø the dividend rate on the Reference Assets or on the equity securities represented by the Reference Assets;
- Ø interest and yield rates in the market generally, as well as in the markets of the equity securities represented by the Reference Assets;
- Ø the occurrence of certain events relating to a Reference Asset that may or may not require an adjustment to the Initial Level, the Coupon Barrier and the Trigger Level;
- Ø economic, financial, political, regulatory or judicial events that affect the Reference Assets or the equity securities represented by the Reference Assets or stock markets generally, and which may affect the market value of the Reference Assets on any Observation Date; and
- Ø our creditworthiness, including actual or anticipated downgrades in our credit ratings.

Some or all of these factors will influence the price you will receive if you choose to sell your Notes prior to maturity. The impact of any of the factors set forth above may enhance or offset some or all of any change resulting from another factor or factors. You may have to sell your Notes at a substantial discount from the principal amount if the market value of the Reference Assets is at, below or not sufficiently above their Initial Levels, the Coupon Barrier or the Trigger Level.

Our Business Activities May Create Conflicts of Interest — We and our affiliates expect to engage in trading activities related to the securities included in or represented by the Reference Assets that are not for the account of holders of the Notes or on their behalf. These trading activities may present a conflict between the holders' interests in the Notes and the interests we and our affiliates will have in their proprietary accounts, in facilitating transactions, including options and other derivatives transactions, for their customers and in accounts under their management. These trading activities, if they influence the prices or levels of the Reference Assets, could be adverse to the interests of the holders of the Notes. We and one or more of our affiliates may, at present or in the future, engage in business with the securities included in or represented by the Reference Assets, including making loans to or providing advisory services. These services could include investment banking and merger and acquisition advisory services. These activities may present a conflict between our or one or more of our affiliates' obligations and your interests as a holder of the Notes. Moreover, we, and our affiliates may have published, and in the future expect to publish, research reports with respect to the Reference Assets or securities included in or represented by the Reference Assets. This research is modified from time to time without notice and may express opinions or provide recommendations that are inconsistent with purchasing or holding the Notes. Any of these activities by us or one or more of our affiliates may affect the prices or levels of the Reference Assets and, therefore, the market value of the Notes.

Market Disruption Events and Adjustments — The Payment at Maturity, each Observation Date and the Valuation Date are subject to adjustment as to each Reference Asset as described in the product prospectus supplement. For a description of what constitutes a market disruption event as well as the consequences of that market disruption event, see "General Terms of the Notes—Market Disruption Events" in the product prospectus supplement and the section

“Additional Terms of the Notes” below.

**You Must Rely on Your Own Evaluation of the Merits of an Investment Linked to the Reference Assets** — In the ordinary course of their business, our affiliates may have expressed views on expected movement in the Reference Assets or the equity securities that they represent, and may do so in the future. These views or reports may be communicated to our clients and clients of our affiliates. However, these views are subject to change from time to time. Moreover, other professionals who transact business in markets relating to any Reference Asset may at any time have significantly different views from those of our affiliates. For these reasons, you are encouraged to derive information concerning the Reference Assets from multiple sources, and you should not rely solely on views expressed by our affiliates.

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**The XBI and its Underlying Index Are Different** — The performance of the XBI may not exactly replicate the performance of its underlying index, because the XBI will reflect transaction costs and fees that are not included in the calculation of its underlying index. It is also possible that the performance of the XBI may not fully replicate or may in certain circumstances diverge significantly from the performance of its underlying index due to the temporary unavailability of certain securities in the secondary market, the performance of any derivative instruments contained in the XBI or due to other circumstances. The XBI may use futures contracts, options, swap agreements, currency forwards and repurchase agreements in seeking performance that corresponds to its underlying index and in managing cash flows.

During periods of market volatility, securities underlying the XBI may be unavailable in the secondary market, market participants may be unable to calculate accurately the net asset value per share of the XBI and the liquidity of the XBI may be adversely affected. This kind of market volatility may also disrupt the ability of market participants to create and redeem shares of the XBI. Further, market volatility may adversely affect, sometimes materially, the prices at which market participants are willing to buy and sell shares of the XBI. As a result, under these circumstances, the market value of shares of the XBI may vary substantially from the net asset value per share of the XBI. For all of the foregoing reasons, the performance of the XBI may not correlate with the performance of its underlying index as well as the net asset value per share of the XBI, which could materially and adversely affect the value of the Notes in the secondary market and/or reduce your payment at maturity

**Management Risk** — The XBI is not managed according to traditional methods of “active” investment management, which involve the buying and selling of securities based on economic, financial and market analysis and investment judgment. Instead, the XBI, utilizing a “passive” or indexing investment approach, attempts to approximate the investment performance of its underlying index by investing in a portfolio of securities that generally replicate its underlying index. Therefore, unless a specific security is removed from its underlying index, the XBI generally would not sell a security because the security’s issuer was in financial trouble. In addition, the XBI is subject to the risk that the investment strategy of its investment advisor may not produce the intended results.

**The Policies of the XBI’s Investment Advisor Could Affect the Amount Payable on the Notes and Their Market Value** — The policies of SSgA Funds Management, Inc., the XBI’s investment advisor, concerning the management of the XBI, additions, deletions or substitutions of the securities held by the XBI could affect the market price of shares of the XBI and, therefore, the amount payable on the Notes on the maturity date and the market value of the Notes before that date. The amount payable on the Notes and their market value could also be affected if the investment advisor changes these policies, for example, by changing the manner in which it manages the XBI, or if the investment advisor discontinues or suspends maintenance of the XBI, in which case it may become difficult to determine the market value of the Notes. The investment advisor has no connection to the offering of the Notes and have no obligations to you as an investor in the Notes in making its decisions regarding the XBI.

**Changes that Affect an Index Will Affect the Market Value of the Notes and the Payments on the Notes** - The policies of the sponsor of each of the S&P® Biotechnology Select Industry® Index (which underlies the XBI) or the SPX concerning the calculation of the applicable index, additions, deletions or substitutions of the components of that index and the manner in which changes affecting those components, such as stock dividends, reorganizations or mergers, may be reflected in the index and, therefore, could affect the amounts payable on the Notes at maturity, and the market value of the Notes prior to maturity. The amounts payable on the Notes and their market value could also be affected if the index sponsor changes these policies, for example, by changing the manner in which it calculates the index, or if the index sponsor discontinues or suspends calculation or publication of the index, in which case it may become difficult to determine the market value of the Notes.

We Have No Affiliation with any Index Sponsor and Will Not Be Responsible for any Actions Taken by an Index Sponsor - No index sponsor is an affiliate of ours or will be involved in the offering of the Notes in any way. Consequently, we have no control of the actions of any index sponsor, including any actions of the type that might impact the value of the Notes. No index sponsor has any obligation of any sort with respect to the Notes. Thus, no index sponsor has any obligation to take your interests into consideration for any reason, including in taking any actions that might affect the value of the Notes. None of our proceeds from the issuance of the Notes will be delivered to any index sponsor.

The Securities Composing the Underlying Index of the XBI Are Concentrated in One Sector — All of the securities included in the underlying index of the XBI are issued by companies in the biotechnology industry. As a result, the securities that will determine the performance of the XBI and the level of the underlying index, which the XBI seeks to replicate, are concentrated in one sector. Although an investment in the Notes will not give holders any ownership or other direct interests in the securities composing the underlying index, the return on an investment in the Notes will be subject to certain risks associated with a direct equity investment in companies in this market sector.

Accordingly, by investing in the Notes, you will not benefit from the diversification which could result from an investment linked to companies that operate in multiple sectors.

An Investment in the Notes Is Subject to Risks Associated with the Biotechnology Sector — All of the stocks held by the XBI and included in its underlying index are issued by companies whose primary lines of business are directly associated with the biotechnology sector. The profitability of these companies is largely dependent on, among other things, demand for the companies' products, safety of the companies' products, regulatory influences on the biotechnology market (including receipt of

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regulatory approvals and compliance with complex regulatory requirements), pricing and reimbursement from third party payors, continued innovation, talent attraction and retention, maintaining intellectual property rights and intense industry competition. Any negative developments affecting the biotechnology sector could affect negatively the price of the XBI and, in turn, could have an adverse effect on the value of the Notes and the payments on the Notes.

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#### ADDITIONAL TERMS OF YOUR NOTES RELATED TO INDICES

##### Closing Level

The closing level of the SPX on any trading day will equal its closing level published following the regular official weekday close of trading on that trading day.

A “trading day” as to the SPX means a day on which the principal trading market for that index is open for trading.

##### Unavailability of the Level of an Index

If the sponsor of the SPX discontinues publication of that index and its sponsor or another entity publishes a successor or substitute index that the calculation agent determines, in its sole discretion, to be comparable to the discontinued index (such successor or substitute index being referred to in this section as a “successor index”), then any subsequent index closing level will be determined by reference to the published level of that successor index at the regular weekday close of trading on the applicable trading day.

Upon any selection by the calculation agent of a successor index, the calculation agent will provide written notice to the trustee of the selection, and the trustee will furnish written notice thereof, to the extent the trustee is required to under the senior debt indenture, to each noteholder, or in the case of global notes, the depositary, as holder of the global notes.

If a successor index is selected by the calculation agent, that successor index will be used as a substitute for that index for all purposes, including for purposes of determining whether a market disruption event exists with respect to that index.

If the sponsor of the SPX discontinues publication of that index prior to, and that discontinuance is continuing on, any trading day on which the level of that index must be determined, and the calculation agent determines, in its sole discretion, that no successor index is available at that time, then the calculation agent will determine the level of that index for the relevant date in accordance with the formula for and method of calculating that index last in effect prior to the discontinuance, without rebalancing or substitution, using the closing level (or, if trading in the relevant underlying securities or components of that index have been materially suspended or materially limited, its good faith estimate of the closing level that would have prevailed but for that suspension or limitation) at the close of the principal trading session of the relevant exchange on that date of each security or component most recently comprising that index. Notwithstanding these alternative arrangements, discontinuance of the publication of the SPX may adversely affect the value of your Notes.

If at any time the method of calculating a closing level for the SPX or a successor index is changed in a material respect, or if the SPX is in any other way modified so that it does not, in the opinion of the calculation agent, fairly represent the level of the SPX had those changes or modifications not been made, then, from and after that time, the calculation agent will, at the close of business in New York City on the applicable trading day, make such calculations and adjustments as, in the good faith judgment of the calculation agent, may be necessary in order to arrive at a level of an index comparable to the SPX as if those changes or modifications had not been made. Accordingly, if the method of calculating the SPX is modified so that the value of the SPX is a fraction of what it would have been if it had not been modified (e.g., due to a split in the SPX), then the calculation agent will adjust the SPX in order to arrive at a value of the SPX as if it had not been modified (e.g., as if such split had not occurred).

##### Index Market Disruption Events

A “market disruption event” with respect to the SPX means any event, circumstance or cause which we determine, and the calculation agent confirms, has or will have a material adverse effect on our ability to perform our obligations under the Notes or to hedge our position in respect of our obligations to make payment of amounts owing thereunder and more specifically includes the following events to the extent that they have such effect with respect to the SPX:

• a suspension, absence or limitation of trading in index components constituting 20% or more, by weight, of the SPX;

a suspension, absence or limitation of trading in futures or options contracts relating to an index on their respective markets;

any event that disrupts or impairs, as determined by the calculation agent, the ability of market participants to (i) effect transactions in, or obtain market values for, index components constituting 20% or more, by weight, of the SPX, or (ii) effect transactions in, or obtain market values for, futures or options contracts relating to the SPX on their respective markets;

the closure on any day of the primary market for futures or options contracts relating to the SPX or index components constituting 20% or more, by weight, of the SPX on a scheduled trading day prior to the scheduled weekday closing time of that market (without regard to after hours or any other trading outside of the regular trading session hours) unless such earlier closing time is announced by the primary market at least one hour prior to the earlier of (i) the

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actual closing time for the regular trading session on such primary market on such scheduled trading day for such primary market and (ii) the submission deadline for orders to be entered into the relevant exchange system for execution at the close of trading on such scheduled trading day for such primary market;  
any scheduled trading day on which (i) the primary markets for index components constituting 20% or more, by weight, of the SPX or (ii) the exchanges or quotation systems, if any, on which futures or options contracts on the SPX are traded, fails to open for trading during its regular trading session; or  
any other event, if the calculation agent determines in its sole discretion that the event interferes with our ability or the ability of any of our affiliates to unwind all or a portion of a hedge with respect to the Notes that we or our affiliates have effected or may effect.

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#### INFORMATION REGARDING THE REFERENCE ASSETS

The SPDR® S&P® Biotech ETF (“XBI”)

Information provided to or filed with the SEC by the XBI under the Securities Act of 1933, as amended, and the Investment Company Act of 1940, as amended, can be located by reference to SEC file numbers 333-57793 and 811-08839, respectively, through the SEC’s website at <http://www.sec.gov>. In addition, information regarding the XBI may be obtained from other sources including, but not limited to, press releases, newspaper articles and other publicly disseminated documents. We have not participated in the preparation of, or verified, such publicly available information. None of the forgoing documents or filings are incorporated by reference in, and should not be considered part of, this document.

The following information regarding the XBI is derived from publicly available information. We have not independently verified the accuracy or completeness of reports filed by the XBI with the SEC, information published by it on its website or in any other format, information about it obtained from any other source or the information provided below. The Notes are not sponsored, endorsed, sold or promoted by the investment advisor. The investment advisor makes no representations or warranties to the owners of the Notes or any member of the public regarding the advisability of investing in the Notes. The investment advisor has no obligation or liability in connection with the operation, marketing, trading or sale of the Notes.

The XBI

The XBI is an investment portfolio maintained and managed by SSgA Funds Management, Inc. The inception date of the XBI is January 31, 2006. The XBI is an exchange traded fund that trades on NYSE Arca under the ticker symbol “XBI.”

The XBI seeks to provide investment results that correspond generally to the price and yield performance, before fees and expenses, of the S&P® Biotechnology Select Industry® Index (the “Underlying Index”). The Underlying Index represents the biotechnology sub-industry portion of the S&P Total Market Index (“S&P TMI”), an index that measures the performance of the U.S. equity market. The XBI is composed of companies that are in the biotechnology sector. The XBI utilizes a “replication” investment approach in attempting to track the performance of the Underlying Index. The XBI typically invests in substantially all of the securities which comprise the Underlying Index in approximately the same proportions as the Underlying Index. The XBI will normally invest at least 80% of its total assets in the common stocks that comprise the Underlying Index.

The Underlying Index

The Underlying Index is an equal-weighted index that is designed to measure the performance of the biotechnology sub-industry portion of the S&P TMI. The S&P TMI includes all U.S. common equities listed on the NYSE (including NYSE Arca), the NYSE MKT, the NASDAQ Global Select Market, and the NASDAQ Capital Market. Each of the component stocks in the Underlying Index is a constituent company within the biotechnology sub-industry portion of the S&P TMI.

To be eligible for inclusion in the Underlying Index, companies must be in the S&P TMI and must be included in the relevant Global Industry Classification Standard (GICS) sub-industry. The GICS was developed to establish a global standard for categorizing companies into sectors and industries. In addition to the above, companies must satisfy one of the two following combined size and liquidity criteria:

- float-adjusted market capitalization above US\$500 million and float-adjusted liquidity ratio above 90%; or
- float-adjusted market capitalization above US\$400 million and float-adjusted liquidity ratio above 150%.

All U.S. companies satisfying these requirements are included in the Underlying Index. The total number of companies in the Underlying Index should be at least 35. If there are fewer than 35 stocks, stocks from a supplementary list of highly correlated sub-industries that meet the market capitalization and liquidity thresholds above are included in order of their float-adjusted market capitalization to reach 35 constituents. Minimum market capitalization requirements may be relaxed to ensure there are at least 22 companies in the Underlying Index as of each rebalancing effective date.

Eligibility factors include:

**Market Capitalization:** Float-adjusted market capitalization should be at least US\$400 million for inclusion in the Underlying Index. Existing index components must have a float-adjusted market capitalization of US\$300 million to remain in the Underlying Index at each rebalancing.

**Liquidity:** The liquidity measurement used is a liquidity ratio, defined as dollar value traded over the previous 12-months divided by the float-adjusted market capitalization as of the Underlying Index rebalancing reference date. Stocks having a float-adjusted market capitalization above US\$500 million must have a liquidity ratio greater than 90% to be eligible for addition to the Underlying Index. Stocks having a float-adjusted market capitalization between US\$400 and US\$500 million must have a

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liquidity ratio greater than 150% to be eligible for addition to the Underlying Index. Existing index constituents must have a liquidity ratio greater than 50% to remain in the Underlying Index at the quarterly rebalancing. The length of time to evaluate liquidity is reduced to the available trading period for IPOs or spin-offs that do not have 12 months of trading history.

**Takeover Restrictions:** At the discretion of S&P, constituents with shareholder ownership restrictions defined in company bylaws may be deemed ineligible for inclusion in the Underlying Index. Ownership restrictions preventing entities from replicating the index weight of a company may be excluded from the eligible universe or removed from the Underlying Index.

**Turnover:** S&P believes turnover in index membership should be avoided when possible. At times, a company may appear to temporarily violate one or more of the addition criteria. However, the addition criteria are for addition to the Underlying Index, not for continued membership. As a result, an index constituent that appears to violate the criteria for addition to the Underlying Index will not be deleted unless ongoing conditions warrant a change in the composition of the Underlying Index.

#### S&P 500® Index (“SPX”)

The SPX is intended to provide an indication of the pattern of common stock price movement. The calculation of the level of the SPX is based on the relative value of the aggregate market value of the common stocks of 500 companies as of a particular time compared to the aggregate average market value of the common stocks of 500 similar companies during the base period of the years 1941 through 1943.

S&P Dow Jones Indices LLC chooses companies for inclusion in the SPX with the aim of achieving a distribution by broad industry groupings that approximates the distribution of these groupings in the common stock population of its Stock Guide Database of over 10,000 companies, which S&P Dow Jones Indices LLC uses as an assumed model for the composition of the total market. Relevant criteria employed by S&P Dow Jones Indices LLC include the viability of the particular company, the extent to which that company represents the industry group to which it is assigned, the extent to which the market price of that company’s common stock generally is responsive to changes in the affairs of the respective industry, and the market value and trading activity of the common stock of that company.

S&P Dow Jones Indices LLC calculates the SPX by reference to the prices of the constituent stocks of the SPX without taking account of the value of dividends paid on those stocks. As a result, the return on the Notes will not reflect the return you would realize if you actually owned the SPX constituent stocks and received the dividends paid on those stocks.

Effective with the September 2015 rebalance, consolidated share class lines will no longer be included in the S&P 500® Index. Each share class line will be subject to public float and liquidity criteria individually, but the company’s total market capitalization will be used to evaluate each share class line. This may result in one listed share class line of a company being included in the S&P 500® Index while a second listed share class line of the same company is excluded.

#### Computation of the SPX

While S&P Dow Jones Indices LLC currently employs the following methodology to calculate the SPX, no assurance can be given that S&P Dow Jones Indices LLC will not modify or change this methodology in a manner that may affect the Payment at Maturity.

Historically, the market value of any component stock of the SPX was calculated as the product of the market price per share and the number of then outstanding shares of such component stock. In March 2005, S&P Dow Jones Indices LLC began shifting the SPX halfway from a market capitalization weighted formula to a float-adjusted formula, before moving the SPX to full float adjustment on September 16, 2005. S&P Dow Jones Indices LLC’s

criteria for selecting stocks for the SPX did not change with the shift to float adjustment. However, the adjustment affects each company's weight in the SPX.

Under float adjustment, the share counts used in calculating the SPX reflect only those shares that are available to investors, not all of a company's outstanding shares. Float adjustment excludes shares that are closely held by control groups, other publicly traded companies or government agencies.

In September 2012, all shareholdings representing more than 5% of a stock's outstanding shares, other than holdings by "block owners," were removed from the float for purposes of calculating the SPX. Generally, these "control holders" will include officers and directors, private equity, venture capital and special equity firms, other publicly traded companies that hold shares for control, strategic partners, holders of restricted shares, ESOPs, employee and family trusts, foundations associated with the company, holders of unlisted share classes of stock, government entities at all levels (other than government retirement/pension funds) and any individual person who controls a 5% or greater stake in a company as reported in regulatory filings. However, holdings by block owners, such as depository banks, pension funds, mutual funds and ETF providers, 401(k) plans of the company, government retirement/pension funds, investment funds of insurance companies, asset managers and investment funds, independent foundations and savings and investment plans, will ordinarily be considered part of the float.

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Treasury stock, stock options, restricted shares, equity participation units, warrants, preferred stock, convertible stock, and rights are not part of the float. Shares held in a trust to allow investors in countries outside the country of domicile, such as depositary shares and Canadian exchangeable shares are normally part of the float unless those shares form a control block. If a company has multiple classes of stock outstanding, shares in an unlisted or non-traded class are treated as a control block.

For each stock, an investable weight factor (“IWF”) is calculated by dividing the available float shares by the total shares outstanding. As of September 21, 2012, available float shares are defined as the total shares outstanding less shares held by control holders. This calculation is subject to a 5% minimum threshold for control blocks. For example, if a company’s officers and directors hold 3% of the company’s shares, and no other control group holds 5% of the company’s shares, S&P Dow Jones Indices LLC would assign that company an IWF of 1.00, as no control group meets the 5% threshold. However, if a company’s officers and directors hold 3% of the company’s shares and another control group holds 20% of the company’s shares, S&P Dow Jones Indices LLC would assign an IWF of 0.77, reflecting the fact that 23% of the company’s outstanding shares are considered to be held for control. For companies with multiple classes of stock, S&P Dow Jones Indices LLC calculates the weighted average IWF for each stock using the proportion of the total company market capitalization of each share class as weights.

The SPX is calculated using a base-weighted aggregate methodology. The level of the SPX reflects the total market value of all 500 component stocks relative to the base period of the years 1941 through 1943. An indexed number is used to represent the results of this calculation in order to make the level easier to use and track over time. The actual total market value of the component stocks during the base period of the years 1941 through 1943 has been set to an indexed level of 10. This is often indicated by the notation 1941-43 = 10. In practice, the daily calculation of the SPX is computed by dividing the total market value of the component stocks by the “index divisor.” By itself, the index divisor is an arbitrary number. However, in the context of the calculation of the SPX, it serves as a link to the original base period level of the SPX. The index divisor keeps the SPX comparable over time and is the manipulation point for all adjustments to the SPX, which is index maintenance.

#### Index Maintenance

Index maintenance includes monitoring and completing the adjustments for company additions and deletions, share changes, stock splits, stock dividends, and stock price adjustments due to company restructuring or spinoffs. Some corporate actions, such as stock splits and stock dividends, require changes in the common shares outstanding and the stock prices of the companies in the SPX, and do not require index divisor adjustments.

To prevent the level of the SPX from changing due to corporate actions, corporate actions which affect the total market value of the SPX require an index divisor adjustment. By adjusting the index divisor for the change in market value, the level of the SPX remains constant and does not reflect the corporate actions of individual companies in the SPX. Index divisor adjustments are made after the close of trading and after the calculation of the SPX closing level. Changes in a company’s shares outstanding of 5.00% or more due to mergers, acquisitions, public offerings, tender offers, Dutch auctions, or exchange offers are made as soon as reasonably possible. Share changes due to mergers or acquisitions of publicly held companies that trade on a major exchange are implemented when the transaction occurs even if both of the companies are not in the same headline index, and regardless of the size of the change. All other changes of 5.00% or more (due to, for example, company stock repurchases, private placements, redemptions, exercise of options, warrants, conversion of preferred stock, notes, debt, equity participation units, at the market offerings, or other recapitalizations) are made weekly and are announced on Fridays for implementation after the close of trading on the following Friday. Changes of less than 5.00% are accumulated and made quarterly on the third Friday of March, June, September, and December, and are usually announced two to five days prior.

If a change in a company's shares outstanding of 5.00% or more causes a company's IWF to change by five percentage points or more, the IWF is updated at the same time as the share change. IWF changes resulting from partial tender offers are considered on a case-by-case basis.

#### License Agreement

S&P® is a registered trademark of Standard & Poor's Financial Services LLC ("S&P") and Dow Jones is a registered trademark of Dow Jones Trademark Holdings LLC ("Dow Jones"). These trademarks have been licensed for use by S&P Dow Jones Indices LLC. "Standard & Poor's", "S&P 500" and "S&P" are trademarks of S&P. These trademarks have been sublicensed for certain purposes by us. The SPX is a product of S&P Dow Jones Indices LLC and/or its affiliates and has been licensed for use by us.

The Notes are not sponsored, endorsed, sold or promoted by S&P Dow Jones Indices LLC, Dow Jones, S&P or any of their respective affiliates (collectively, "S&P Dow Jones Indices"). S&P Dow Jones Indices make no representation or warranty, express or implied, to the holders of the Notes or any member of the public regarding the advisability of investing in securities generally or in the Notes particularly or the ability of the SPX to track general market performance. S&P Dow Jones Indices' only relationship to us with respect to the SPX is the licensing of the SPX and certain trademarks, service marks and/or trade names of S&P Dow Jones Indices and/or its third party licensors. The SPX is determined, composed and calculated by S&P Dow Jones Indices without regard to us or the Notes. S&P Dow Jones Indices have no obligation to take our needs or the needs of holders of the Notes into consideration in determining, composing or calculating the SPX. S&P Dow Jones Indices are not responsible for and have not participated in the

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determination of the prices, and amount of the Notes or the timing of the issuance or sale of the Notes or in the determination or calculation of the equation by which the Notes are to be converted into cash. S&P Dow Jones Indices have no obligation or liability in connection with the administration, marketing or trading of the Notes. There is no assurance that investment products based on the SPX will accurately track index performance or provide positive investment returns. S&P Dow Jones Indices LLC and its subsidiaries are not investment advisors. Inclusion of a security or futures contract within an index is not a recommendation by S&P Dow Jones Indices to buy, sell, or hold such security or futures contract, nor is it considered to be investment advice. Notwithstanding the foregoing, CME Group Inc. and its affiliates may independently issue and/or sponsor financial products unrelated to the Notes currently being issued by us, but which may be similar to and competitive with the Notes. In addition, CME Group Inc. and its affiliates may trade financial products which are linked to the performance of the SPX. It is possible that this trading activity will affect the value of the Notes.

S&P DOW JONES INDICES DO NOT GUARANTEE THE ADEQUACY, ACCURACY, TIMELINESS AND/OR THE COMPLETENESS OF THE SPX OR ANY DATA RELATED THERETO OR ANY COMMUNICATION, INCLUDING BUT NOT LIMITED TO, ORAL OR WRITTEN COMMUNICATION (INCLUDING ELECTRONIC COMMUNICATIONS) WITH RESPECT THERETO. S&P DOW JONES INDICES SHALL NOT BE SUBJECT TO ANY DAMAGES OR LIABILITY FOR ANY ERRORS, OMISSIONS, OR DELAYS THEREIN. S&P DOW JONES INDICES MAKE NO EXPRESS OR IMPLIED WARRANTIES, AND EXPRESSLY DISCLAIMS ALL WARRANTIES, OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE OR USE OR AS TO RESULTS TO BE OBTAINED BY US, HOLDERS OF THE NOTES, OR ANY OTHER PERSON OR ENTITY FROM THE USE OF THE SPX OR WITH RESPECT TO ANY DATA RELATED THERETO. WITHOUT LIMITING ANY OF THE FOREGOING, IN NO EVENT WHATSOEVER SHALL S&P DOW JONES INDICES BE LIABLE FOR ANY INDIRECT, SPECIAL, INCIDENTAL, PUNITIVE, OR CONSEQUENTIAL DAMAGES INCLUDING BUT NOT LIMITED TO, LOSS OF PROFITS, TRADING LOSSES, LOST TIME OR GOODWILL, EVEN IF THEY HAVE BEEN ADVISED OF THE POSSIBILITY OF SUCH DAMAGES, WHETHER IN CONTRACT, TORT, STRICT LIABILITY, OR OTHERWISE. THERE ARE NO THIRD PARTY BENEFICIARIES OF ANY AGREEMENTS OR ARRANGEMENTS BETWEEN S&P DOW JONES INDICES AND US, OTHER THAN THE LICENSORS OF S&P DOW JONES INDICES.

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#### HISTORICAL INFORMATION

The graphs below set forth the information relating to the historical performance of the Reference Assets. In addition, below the graphs are tables setting forth the intra-day high, intra-day low and period-end closing prices or levels of the Reference Assets. The information provided in these tables is for the four calendar quarters of 2013, 2014, 2015 and 2016, the first and second quarters of 2017, and the period from July 1, 2017 through August 1, 2017.

We obtained the information regarding the historical performance of the Reference Assets in the graphs and tables below from Bloomberg Financial Markets.

We have not independently verified the accuracy or completeness of the information obtained from Bloomberg Financial Markets. The historical performance of any Reference Asset should not be taken as an indication of its future performance, and no assurance can be given as to the prices or levels of the Reference Assets at any time. We cannot give you assurance that the performance of the Reference Assets will not result in the loss of all or part of your investment.

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#### Historical Information for the SPDR® S&P® Biotech ETF (“XBI”)

Below is a table setting forth the intra-day high, intra-day low and period-end closing prices of this Reference Asset. The information provided in the table is for the period from January 1, 2013 through August 1, 2017.

| Period-Start Date | Period-End Date | High Intra-Day Price of this Reference Asset (\$) | Low Intra-Day Price of this Reference Asset (\$) | Period-End Closing Price of this Reference Asset (\$) |
|-------------------|-----------------|---|--|---|
| 1/1/2013          | 3/31/2013       | 33.55   | 30.41  | 33.29   |
| 4/1/2013          | 6/30/2013       | 37.66   | 32.39  | 34.75   |
| 7/1/2013          | 9/30/2013       | 43.74   | 36.24  | 43.05   |
| 10/1/2013         | 12/31/2013      | 43.95   | 38.08  | 43.40   |
| 1/1/2014          | 3/31/2014       | 56.90   | 42.97  | 47.49   |
| 4/1/2014          | 6/30/2014       | 51.35   | 40.27  | 51.35   |
| 7/1/2014          | 9/30/2014       | 54.30   | 44.87  | 51.99   |
| 10/1/2014         | 12/31/2014      | 63.45   | 48.48  | 62.21   |
| 1/1/2015          | 3/31/2015       | 79.33   | 61.43  | 75.17   |
| 4/1/2015          | 6/30/2015       | 86.57   | 68.78  | 84.08   |
| 7/1/2015          | 9/30/2015       | 90.36   | 60.02  | 62.25   |
| 10/1/2015         | 12/31/2015      | 72.62   | 61.16  | 70.08   |
| 1/1/2016          | 3/31/2016       | 67.83   | 45.73  | 51.66   |
| 4/1/2016          | 6/30/2016       | 59.87   | 49.55  | 54.09   |
| 7/1/2016          | 9/30/2016       | 68.83   | 55.11  | 66.29   |
| 10/1/2016         | 12/31/2016      | 68.13   | 53.31  | 59.19   |
| 1/1/2017          | 3/31/2017       | 72.32   | 59.59  | 69.34   |
| 4/1/2017          | 6/30/2017       | 80.31   | 66.84  | 77.18   |
| 7/1/2017          | 8/1/2017        | 82.38   | 76.40  | 77.09   |

#### PAST PERFORMANCE IS NOT INDICATIVE OF FUTURE RESULTS.

The graph below illustrates the performance of this Reference Asset from January 1, 2013 to August 1, 2017, reflecting its Initial Level of \$77.09. The red line represents its Coupon Barrier and Trigger Level of \$47.02, which is equal to 61.00% of its Initial Level, rounded to two decimal places.

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#### Historical Information for the S&P 500® Index (“SPX”)

Below is a table setting forth the intra-day high, intra-day low and period-end closing levels of this Reference Asset. The information provided in the table is for the period from January 1, 2013 through August 1, 2017.

| Period-Start Date | Period-End Date | High Intra-Day Level of this Reference Asset | Low Intra-Day Level of this Reference Asset | Period-End Closing Level of this Reference Asset |
|-------------------|-----------------|--|---|--|
| 1/1/2013          | 3/31/2013       | 1,570.28                                     | 1,426.19                                    | 1,569.19   |
| 4/1/2013          | 6/30/2013       | 1,687.18                                     | 1,536.03                                    | 1,606.28   |
| 7/1/2013          | 9/30/2013       | 1,729.86                                     | 1,604.57                                    | 1,681.55   |
| 10/1/2013         | 12/31/2013      | 1,849.44                                     | 1,646.47                                    | 1,848.36   |
| 1/1/2014          | 3/31/2014       | 1,883.97                                     | 1,737.92                                    | 1,872.34   |
| 4/1/2014          | 6/30/2014       | 1,968.17                                     | 1,814.36                                    | 1,960.23   |
| 7/1/2014          | 9/30/2014       | 2,019.26                                     | 1,904.78                                    | 1,972.29   |
| 10/1/2014         | 12/31/2014      | 2,093.55                                     | 1,820.66                                    | 2,058.90   |
| 1/1/2015          | 3/31/2015       | 2,119.59                                     | 1,980.90                                    | 2,067.89   |
| 4/1/2015          | 6/30/2015       | 2,134.72                                     | 2,048.38                                    | 2,063.11   |
| 7/1/2015          | 9/30/2015       | 2,132.82                                     | 1,867.01                                    | 1,920.03   |
| 10/1/2015         | 12/31/2015      | 2,116.48                                     | 1,893.70                                    | 2,043.94   |
| 1/1/2016          | 3/31/2016       | 2,072.21                                     | 1,810.10                                    | 2,059.74   |
| 4/1/2016          | 6/30/2016       | 2,120.55                                     | 1,991.68                                    | 2,098.86   |
| 7/1/2016          | 9/30/2016       | 2,193.81                                     | 2,074.02                                    | 2,168.27   |
| 10/1/2016         | 12/31/2016      | 2,277.53                                     | 2,083.79                                    | 2,238.83   |
| 1/1/2017          | 3/31/2017       | 2,400.98                                     | 2,245.13                                    | 2,362.72   |
| 4/1/2017          | 6/30/2017       | 2,453.82                                     | 2,328.95                                    | 2,423.41   |
| 7/1/2017          | 8/1/2017        | 2,484.04                                     | 2,407.70                                    | 2,476.35   |

PAST PERFORMANCE IS NOT INDICATIVE OF FUTURE RESULTS.

The graph below illustrates the performance of this Reference Asset from January 1, 2012 to August 1, 2017, reflecting its Initial Level of 2,476.35. The red line represents its Coupon Barrier and Trigger Level of 1,510.57, which is equal to 61.00% of its Initial Level, rounded to two decimal places.

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#### USE OF PROCEEDS AND HEDGING

In anticipation of the sale of the Notes, we expect to enter into hedging transactions with one or more of our affiliates, involving purchases of the securities represented by the Reference Assets, shares of the XBI and/or listed and/or over-the-counter derivative instruments related to any of those securities or the Reference Assets prior to or on the Trade Date. From time to time, including around the time of each Observation Date and the Maturity Date, we, RBCCM, and our other affiliates may enter into additional hedging transactions or unwind those that we or they have entered into. In this regard, we, RBCCM, and our other affiliates may:

- acquire or dispose of investments relating to the Reference Assets;
- acquire or dispose of long or short positions in listed or over-the-counter derivative instruments based on the Reference Assets; or
- any combination of the above two.

We, RBCCM and our other affiliates may acquire a long or short position in securities similar to the Notes from time to time and may, in our or their sole discretion, hold or resell those similar securities.

We, RBCCM and our other affiliates may close out our or their hedges on or before any Observation Date. That step may involve sales or purchases of the securities represented by the Reference Assets, shares of the XBI, or over-the-counter derivative instruments linked to the Reference Assets.

#### SUPPLEMENTAL DISCUSSION OF

#### U.S. FEDERAL INCOME TAX CONSEQUENCES

The following disclosure supplements, and to the extent inconsistent supersedes, the discussion in the product prospectus supplement dated January 8, 2016 under “Supplemental Discussion of U.S. Federal Income Tax Consequences.”

Under Section 871(m) of the Code, a “dividend equivalent” payment is treated as a dividend from sources within the United States. Such payments generally would be subject to a 30% U.S. withholding tax if paid to a non-U.S. holder. Under U.S. Treasury Department regulations, payments (including deemed payments) with respect to equity-linked instruments (“ELIs”) that are “specified ELIs” may be treated as dividend equivalents if such specified ELIs reference an interest in an “underlying security,” which is generally any interest in an entity taxable as a corporation for U.S. federal income tax purposes if a payment with respect to such interest could give rise to a U.S. source dividend. However, U.S. Treasury Department regulations provide that withholding on dividend equivalent payments will not apply to specified ELIs that are not delta-one instruments and that are issued before January 1, 2018. Based on our determination that the Notes are not delta-one instruments, non-U.S. holders should not be subject to withholding on dividend equivalent payments, if any, under the Notes. However, it is possible that the Notes could be treated as deemed reissued for U.S. federal income tax purposes upon the occurrence of certain events affecting the Reference Asset or the Notes (for example, upon an index rebalancing), and following such occurrence the Notes could be treated as subject to withholding on dividend equivalent payments. Non-U.S. holders that enter, or have entered, into other transactions in respect of the Reference Asset or the Notes should consult their tax advisors as to the application of the dividend equivalent withholding tax in the context of the Notes and their other transactions. If any payments are treated as dividend equivalents subject to withholding, we (or the applicable withholding agent) would be entitled to withhold taxes without being required to pay any additional amounts with respect to amounts so withheld.

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#### SUPPLEMENTAL PLAN OF DISTRIBUTION (CONFLICTS OF INTEREST)

Delivery of the Notes will be made against payment for the Notes on August 4, 2017, which is the third (3rd) business day following the Trade Date (this settlement cycle being referred to as “T+3”). See “Plan of Distribution” in the prospectus dated January 8, 2016. For additional information as to the relationship between us and RBCCM, please see the section “Plan of Distribution—Conflicts of Interest” in the prospectus dated January 8, 2016.

The value of the Notes shown on your account statement may be based on RBCCM’s estimate of the value of the Notes if RBCCM or another of our affiliates were to make a market in the Notes (which it is not obligated to do). That estimate will be based upon the price that RBCCM may pay for the Notes in light of then prevailing market conditions, our creditworthiness and transaction costs. For a period of approximately three months after the issue date of the Notes, the value of the Notes that may be shown on your account statement may be higher than RBCCM’s estimated value of the Notes at that time. This is because the estimated value of the Notes will not include the underwriting discount and our hedging costs and profits; however, the value of the Notes shown on your account statement during that period may initially be a higher amount, reflecting the addition of RBCCM’s underwriting discount and our estimated costs and profits from hedging the Notes. This excess is expected to decrease over time until the end of this period. After this period, if RBCCM repurchases your Notes, it expects to do so at prices that reflect their estimated value.

We may use this pricing supplement in the initial sale of the Notes. In addition, RBCCM or another of our affiliates may use this pricing supplement in a market-making transaction in the Notes after their initial sale. Unless we or our agent informs the purchaser otherwise in the confirmation of sale, this pricing supplement is being used in a market-making transaction.

#### STRUCTURING THE NOTES

The Notes are our debt securities, the return on which is linked to the performance of the Reference Assets. As is the case for all of our debt securities, including our structured notes, the economic terms of the Notes reflect our actual or perceived creditworthiness at the time of pricing. In addition, because structured notes result in increased operational, funding and liability management costs to us, we typically borrow the funds under these Notes at a rate that is more favorable to us than the rate that we might pay for a conventional fixed or floating rate debt security of comparable maturity. Using this relatively lower implied borrowing rate rather than the secondary market rate, is a factor that reduced the initial estimated value of the Notes at the time their terms were set. Unlike the estimated value included in this pricing supplement, any value of the Notes determined for purposes of a secondary market transaction may be based on a different funding rate, which may result in a lower value for the Notes than if our initial internal funding rate were used.

In order to satisfy our payment obligations under the Notes, we may choose to enter into certain hedging arrangements (which may include call options, put options or other derivatives) on the issue date with RBCCM or one of our other subsidiaries. The terms of these hedging arrangements take into account a number of factors, including our creditworthiness, interest rate movements, the volatility of the Reference Assets, and the tenor of the Notes. The economic terms of the Notes and their initial estimated value depend in part on the terms of these hedging arrangements.

The lower implied borrowing rate is a factor that reduced the economic terms of the Notes to you. The initial offering price of the Notes also reflects the underwriting commission and our estimated hedging costs. These factors resulted in the initial estimated value for the Notes on the Trade Date being less than their public offering price. See “Selected Risk Considerations—The Initial Estimated Value of the Notes Is Less than the Price to the Public” above.



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#### VALIDITY OF THE NOTES

In the opinion of Norton Rose Fulbright Canada LLP, the issue and sale of the Notes has been duly authorized by all necessary corporate action of the Bank in conformity with the Indenture, and when the Notes have been duly executed, authenticated and issued in accordance with the Indenture and delivered against payment therefor, the Notes will be validly issued and, to the extent validity of the Notes is a matter governed by the laws of the Province of Ontario or Québec, or the laws of Canada applicable therein, and will be valid obligations of the Bank, subject to equitable remedies which may only be granted at the discretion of a court of competent authority, subject to applicable bankruptcy, to rights to indemnity and contribution under the Notes or the Indenture which may be limited by applicable law; to insolvency and other laws of general application affecting creditors' rights, to limitations under applicable limitations statutes, and to limitations as to the currency in which judgments in Canada may be rendered, as prescribed by the Currency Act (Canada). This opinion is given as of the date hereof and is limited to the laws of the Provinces of Ontario and Québec and the federal laws of Canada applicable thereto. In addition, this opinion is subject to customary assumptions about the Trustee's authorization, execution and delivery of the Indenture and the genuineness of signatures and certain factual matters, all as stated in the letter of such counsel dated January 8, 2016, which has been filed as Exhibit 5.1 to Royal Bank's Form 6-K filed with the SEC dated January 8, 2016.

In the opinion of Morrison & Foerster LLP, when the Notes have been duly completed in accordance with the Indenture and issued and sold as contemplated by the prospectus supplement and the prospectus, the Notes will be valid, binding and enforceable obligations of Royal Bank, entitled to the benefits of the Indenture, subject to applicable bankruptcy, insolvency and similar laws affecting creditors' rights generally, concepts of reasonableness and equitable principles of general applicability (including, without limitation, concepts of good faith, fair dealing and the lack of bad faith). This opinion is given as of the date hereof and is limited to the laws of the State of New York. This opinion is subject to customary assumptions about the Trustee's authorization, execution and delivery of the Indenture and the genuineness of signatures and to such counsel's reliance on the Bank and other sources as to certain factual matters, all as stated in the legal opinion dated January 8, 2016, which has been filed as Exhibit 5.2 to the Bank's Form 6-K dated January 8, 2016.

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