

ROYAL BANK OF CANADA  
 Form 424B2  
 November 15, 2018

RBC Capital Markets® Filed Pursuant to Rule 424(b)(2)  
 Registration Statement No. 333-227001

Pricing Supplement  
 Dated November 14,  
 2018

To the Product \$2,100,000  
 Prospectus Supplement Buffered Enhanced Return Notes  
 ERN-ETF-1 Dated Linked to the Invesco QQQ™ Trust, Series  
 September 11, 2018, 1, Due August 14, 2020  
 Prospectus Supplement Royal Bank of Canada  
 Dated September 7,  
 2018, and Prospectus  
 Dated September 7, 2018

Royal Bank of Canada is offering the Buffered Enhanced Return Notes (the “Notes”) linked to the performance of the Invesco QQQ™ Trust, Series 1 (the “Reference Asset”).

The CUSIP number for the Notes is 78013XSF6. The Notes do not pay interest. The Notes provide a 150.00% leveraged positive return if the share price of the Reference Asset increases from the Initial Level to the Final Level, subject to the Maximum Redemption Amount of 120.025% of the principal amount of the Notes. Investors will lose 1% of the principal amount of the Notes for each 1% decrease from the Initial Level to the Final Level of more than 15%. Any payments on the Notes are subject to our credit risk.

Issue Date: November 19, 2018

Maturity Date: August 14, 2020

The Notes will not be listed on any securities exchange.

Investing in the Notes involves a number of risks. See “Risk Factors” beginning on page S-1 of the prospectus supplement dated September 7, 2018, “Additional Risk Factors Specific to the Notes” beginning on page PS-6 of the product prospectus supplement dated September 11, 2018, and “Selected Risk Considerations” beginning on page P-6 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. The Notes are not subject to conversion into our common shares under subsection 39.2(2.3) of the Canada Deposit Insurance Corporation Act. Neither the Securities and Exchange Commission nor any state securities commission has approved or disapproved of these securities or determined that this pricing supplement is truthful or complete. Any representation to the contrary is a criminal offense.

	<u>Per Note</u>	<u>Total</u>
Price to public	100.00%	\$2,100,000
Underwriting discounts and commissions	0.60%	\$12,600
Proceeds to Royal Bank of Canada	99.40%	\$2,087,400

The initial estimated value of the Notes as of the date of this pricing supplement is \$987.36 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 \$6.00 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 \$6.00 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.

RBC Capital Markets, LLC

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Buffered Enhanced Return Notes  
 Linked to the Invesco QQQ™ Trust,  
 Series 1

**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.

**Issuer:** Royal Bank of Canada (“Royal Bank”)

**Underwriter:** RBC Capital Markets, LLC (“RBCCM”)

**Reference Asset:** Invesco QQQ™ Trust, Series 1. The Reference Asset seeks investment results that correspond generally to the price and yield performance, before fees and expenses, of the NASDAQ 100® Index (the “Underlying Index”). Invesco Capital Management LLC (the “Advisor”) serves as the investment advisor to the Reference Asset.

**Bloomberg Ticker:** QQQ

**Currency:** U.S. Dollars

**Minimum Investment:** \$1,000 and minimum denominations of \$1,000 in excess thereof

**Pricing Date:** November 14, 2018

**Issue Date:** November 19, 2018

**CUSIP:** 78013XSF6

**Valuation Date:** August 11, 2020

If, on the Valuation Date, the Percentage Change is positive, then the investor will receive an amount per \$1,000 principal amount per Note equal to the lesser of:

1. Principal Amount + (Principal Amount x Percentage Change x Leverage Factor) and
2. the Maximum Redemption Amount

**Payment at Maturity (if held to maturity):** If, on the Valuation Date, the Percentage Change is less than or equal to 0%, but not by more than the Buffer Percentage (that is, the Percentage Change is between zero and –15%), then the investor will receive the principal amount only.

If, on the Valuation Date, the Percentage Change is negative, by more than the Buffer Percentage (that is, the Percentage Change is between –15.01% and -100%), then the investor will receive a cash payment equal to:  
 Principal Amount + [Principal Amount x (Percentage Change + Buffer Percentage)]

**Percentage Change:** The Percentage Change, expressed as a percentage, is calculated using the following formula:  

$$\frac{\text{Final Level} - \text{Initial Level}}{\text{Initial Level}}$$

**Initial Level:** \$165.20, which was the closing share price of the Reference Asset on the Pricing Date.

**Final Level:** The closing share price of the Reference Asset on the Valuation Date.

**Leverage Factor:** 150.00% (subject to the Maximum Redemption Amount)

**Maximum Redemption Amount:** 120.025% multiplied by the principal amount



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Buffer Percentage: 15%

Buffer Level: \$140.42, which is 85% of the Initial Level

Maturity Date: August 14, 2020, subject to extension for market and other disruptions, as described in the product prospectus supplement dated September 11, 2018.

Principal at Risk: The Notes are NOT principal protected. You may lose a substantial portion of your principal amount at maturity if the Final Level is less than the Buffer Level of 85%.

Calculation Agent: 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 Notes as a pre-paid cash-settled derivative contract 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 September 11, 2018 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 of your Notes.

Listing: The Notes will not be listed on any securities exchange.

Clearance and Settlement: DTC global (including through its indirect participants Euroclear and Clearstream, Luxembourg as described under “Description of Debt Securities—Ownership and Book-Entry Issuance” in the prospectus dated September 7, 2018).

Terms Incorporated in the Master Note: All of the terms appearing above the item captioned “Secondary Market” on pages P-2 and P-3 of this pricing supplement and the terms appearing under the caption “General Terms of the Notes” in the product prospectus supplement dated September 11, 2018, as modified by this pricing supplement.

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#### ADDITIONAL TERMS OF YOUR NOTES

You should read this pricing supplement together with the prospectus dated September 7, 2018, as supplemented by the prospectus supplement dated September 7, 2018 and the product prospectus supplement dated September 11, 2018, relating to our Senior Global Medium-Term Notes, Series H, 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.

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 September 7, 2018 and “Additional Risk Factors Specific to the Notes” in the product prospectus supplement dated September 11, 2018, 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 September 7, 2018:

<https://www.sec.gov/Archives/edgar/data/1000275/000121465918005973/196181424b3.htm>

Prospectus Supplement dated September 7, 2018:

<https://www.sec.gov/Archives/edgar/data/1000275/000121465918005975/f97180424b3.htm>

Product Prospectus Supplement ERN-ETF-1 dated September 11, 2018:

<https://www.sec.gov/Archives/edgar/data/1000275/000114036118038211/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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**HYPOTHETICAL RETURNS**

The examples set out below are included for illustration purposes only. The hypothetical Percentage Changes of the Reference Asset used to illustrate the calculation of the Payment at Maturity (rounded to two decimal places) are not estimates or forecasts of the Final Level or the share price of the Reference Asset on any trading day prior to the Maturity Date. All examples are based on the Buffer Percentage of 15% (the Buffer Level is 85% of the Initial Level), a Leverage Factor of 150.00%, the Maximum Redemption Amount of 120.025% of the principal amount and assume that a holder purchased Notes with an aggregate principal amount of \$1,000 and that no market disruption event occurs on the Valuation Date.

Example 1— Calculation of the Payment at Maturity where the Percentage Change is positive.

Percentage Change: 5%  
 Payment at Maturity:  $\$1,000 + (\$1,000 \times 5\% \times 150.00\%) = \$1,000 + \$75.00 = \$1,075.00$   
 On a \$1,000 investment, a 5% Percentage Change results in a Payment at Maturity of \$1,075.00, a 7.50% return on the Notes.

Example 2— Calculation of the Payment at Maturity where the Percentage Change is positive (and the Payment at Maturity is subject to the Maximum Redemption Amount).

Percentage Change: 20.00%  
 $\$1,000 + (\$1,000 \times 20.00\% \times 150.00\%) = \$1,000 + \$300.00 = \$1,300.00$   
 Payment at Maturity: However, the Maximum Redemption Amount is \$1,200.25  
 On a \$1,000 investment, a 20.00% Percentage Change results in a Payment at Maturity of \$1,200.25, a 20.025% return on the Notes.

Example 3— Calculation of the Payment at Maturity where the Percentage Change is negative (but not by more than the Buffer Percentage).

Percentage Change: -8%  
 Payment at Maturity: At maturity, if the Percentage Change is negative BUT not by more than the Buffer Percentage, then the Payment at Maturity will equal the principal amount.  
 On a \$1,000 investment, a -8% Percentage Change results in a Payment at Maturity of \$1,000, a 0% return on the Notes.

Example 4— Calculation of the Payment at Maturity where the Percentage Change is negative (by more than the Buffer Percentage).

Percentage Change: -38%  
 Payment at Maturity:  $\$1,000 + [\$1,000 \times (-38\% + 15\%)] = \$1,000 - \$230 = \$770$   
 On a \$1,000 investment, a -38% Percentage Change results in a Payment at Maturity of \$770, a -23% return on the 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 Asset. These risks are explained in more detail in the section “Additional Risk Factors Specific to the Notes,” beginning on page PS-4 of 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 a substantial portion of their principal amount if there is a decline in the share price of the Reference Asset. You will lose 1% of the principal amount of your Notes for each 1% that the Final Level is less than the Initial Level by more than 15%.

**The Notes Do Not Pay Interest and Your Return May Be Lower than the Return on a Conventional Debt Security of Comparable Maturity** — There will be no periodic interest payments on the Notes as there would be on a conventional fixed-rate or floating-rate debt security having the same 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 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.

**Your Potential Payment at Maturity Is Limited** — The Notes will provide less opportunity to participate in the appreciation of the Reference Asset than an investment in a security linked to the Reference Asset providing full participation in the appreciation, because the payment at maturity will not exceed the Maximum Redemption Amount. Accordingly, your return on the Notes may be less than your return would be if you made an investment in the Reference Asset or a security directly linked to the positive performance of the Reference Asset.

**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 the amount due on the maturity date is dependent upon Royal Bank’s ability to repay its obligations at that time. This will be the case even if the share price of the Reference Asset increases after the Pricing Date. No assurance can be given as to what our financial condition will be at the maturity 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.

**You Will Not Have Any Rights to the Securities Included in the Reference Asset** — As a holder of the Notes, you will not have voting rights or rights to receive cash dividends or other distributions or other rights that holders of securities included in the Reference Asset would have. The Final Level will not reflect any dividends paid on the securities included in the Reference Asset, and accordingly, any positive return on the Notes may be less than the potential positive return on those securities.

**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 share price of the Reference Asset, the borrowing rate we pay to issue securities of this kind, and the inclusion in the price to the public of 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 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.

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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 Pricing 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 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.

An Investment in Notes Linked to the Reference Asset Is Subject to Risks Associated with Foreign Securities Markets — The Underlying Index tracks the value of certain foreign equity securities. You should be aware that investments in securities linked to the value of foreign equity securities involve particular risks. The foreign securities markets comprising the Underlying Index may have less liquidity and may be more volatile than U.S. or other securities markets and market developments may affect foreign markets differently from U.S. or other securities markets. Direct or indirect government intervention to stabilize these foreign securities markets, as well as cross-shareholdings in foreign companies, may affect trading prices and volumes in these markets. Also, there is generally less publicly available information about foreign companies than about those U.S. companies that are subject to the reporting requirements of the U.S. Securities and Exchange Commission, and foreign companies are subject to accounting, auditing and financial reporting standards and requirements that differ from those applicable to U.S. reporting companies.

Prices of securities in foreign countries are subject to political, economic, financial and social factors that apply in those geographical regions. These factors, which could negatively affect those securities markets, include the possibility of recent or future changes in a foreign government’s economic and fiscal policies, the possible imposition of, or changes in, currency exchange laws or other laws or restrictions applicable to foreign companies or investments in foreign equity securities and the possibility of fluctuations in the rate of exchange between currencies, the possibility of outbreaks of hostility and political instability and the possibility of natural disaster or adverse public health developments in the region. Moreover, foreign economies may differ favorably or unfavorably from the U.S. economy in important respects such as growth of gross national product, rate of inflation, capital reinvestment, resources and self-sufficiency.

Changes that Affect the Underlying Index Will Affect the Market Value of the Notes and the Amount You Will Receive at Maturity — The policies of Invesco Capital Management LLC, the sponsor of the Underlying Index (the “Index Sponsor”), concerning the calculation of the Underlying Index, additions, deletions or substitutions of the components of the Underlying Index and the manner in which changes affecting those components, such as stock dividends, reorganizations or mergers, may be reflected in the Underlying Index and, therefore, could affect the share price of the Reference Asset, the amount payable on the Notes at maturity, and the market value of the Notes prior to maturity. The amount 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 Underlying Index, or if the sponsor discontinues or suspends the calculation or publication of the Underlying Index.

Adjustments to the Reference Asset Could Adversely Affect the Notes — The Advisor of the Reference Asset is responsible for calculating and maintaining the Reference Asset. The Advisor can add, delete or substitute the stocks comprising the Reference Asset. The Advisor may make other methodological changes that could change the share price of the Reference Asset at any time. If one or more of these events occurs, the calculation of the amount payable at maturity may be adjusted to reflect such event or events. Consequently, any of these actions could adversely affect the amount payable at maturity and/or the market value of the Notes.

We Have No Affiliation with the Index Sponsor and Will Not Be Responsible for Any Actions Taken by the Index Sponsor — The Index Sponsor is not an affiliate of ours and will not be involved in the offering of the Notes in any way. Consequently, we have no control over the actions of the Index Sponsor, including any actions of the type that would require the calculation agent to adjust the payment to you at maturity. The Index Sponsor has no obligation of any sort with respect to the Notes. Thus, the Index Sponsor has no obligation to take your interests into consideration for any reason, including in

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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 the Index Sponsor.

**We and Our Affiliates Do Not Have Any Affiliation with the Advisor and Are Not Responsible for its Public Disclosure of Information** — We and our affiliates are not affiliated with Advisor in any way and have no ability to control or predict its actions, including any errors in or discontinuance of disclosure regarding its methods or policies relating to the Reference Asset. The Advisor is not involved in the offering of the Notes in any way and has no obligation to consider your interests as an owner of the Notes in taking any actions relating to the Reference Asset that might affect the value of the Notes. Neither we nor any of our affiliates has independently verified the adequacy or accuracy of the information about the Advisor or the Reference Asset contained in any public disclosure of information. You, as an investor in the Notes, should make your own investigation into the Reference Asset.

**The Correlation Between the Performance of the Reference Asset and the Performance of the Underlying Index May Be Imperfect** — The performance of the Reference Asset is linked principally to the performance of the Underlying Index. However, because of the potential discrepancies identified in more detail in the product prospectus supplement, the return on the Reference Asset may correlate imperfectly with the return on the Underlying Index.

**The Reference Asset Is Subject to Management Risks** — The Reference Asset is subject to management risk, which is the risk that the Advisor's investment strategy, the implementation of which is subject to a number of constraints, may not produce the intended results. For example, the Advisor may invest a portion of the Reference Asset's assets in securities not included in the relevant industry or sector but which the Advisor believes will help the Reference Asset track the relevant industry or sector.

**Our Business Activities May Create Conflicts of Interest** — We and our affiliates expect to engage in trading activities related to the Reference Asset or the securities held by the Reference Asset 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 of the Reference Asset, 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 issuers of the securities held by the Reference Asset, 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 Asset. 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 price of the Reference Asset, and, therefore, the market value of the Notes.

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#### INFORMATION REGARDING THE REFERENCE ASSET

##### The QQQ

The QQQ is a unit investment trust designed to generally correspond to the price and yield performance of the NASDAQ-100 Index<sup>®</sup> (the “NDX”). The QQQ will, under most circumstances, consist of all of stocks in the NDX. The NDX includes 100 of the largest domestic and international nonfinancial companies listed on the Nasdaq Stock Market based on market capitalization. The QQQ and the NDX are rebalanced quarterly and reconstituted annually. The QQQ’s sponsor is Invesco Capital Management LLC.

Shares of the QQQ are listed on The NASDAQ Stock Market, Inc., under the symbol “QQQ.”

Additional information about the QQQ may be found in its filings under the Investment Company Act and the Securities Exchange Act, which may be found on the SEC’s website, [www.sec.gov](http://www.sec.gov). We have not made any investigation as to the accuracy of those filings, and those filings will not be deemed to be included or incorporated by reference in this document.

##### Description of the NASDAQ-100 Index<sup>®</sup>

The Nasdaq-100 Index (the “NDX”) includes 100 of the largest U.S. and non-U.S. non-financial companies listed on The Nasdaq Stock Market based on market capitalization. The NDX reflects companies across major industry groups, including computer hardware and software, telecommunications, retail/wholesale trade and biotechnology. It does not contain securities of financial companies such as investment companies.

The NDX is calculated under a modified capitalization-weighted methodology. The methodology is expected to retain in general the economic attributes of capitalization-weighting while providing enhanced diversification. To accomplish this, Nasdaq will review the composition of the index on a quarterly basis and adjust the weightings of NDX components using a proprietary algorithm, if certain pre-established weight distribution requirements are not met. Additional information relating to the NDX and its method of calculation may be found on Nasdaq’s website. However, information on that website is not deemed to be included or incorporated by reference in this document.

We encourage you to review recent levels of the NDX prior to making an investment decision.

##### Initial Eligibility Criteria

To be eligible for initial inclusion in the NDX, a security must meet the following criteria:

- the issuer of the security’s primary U.S. listing must be exclusively listed on the Nasdaq Global Select Market or the Nasdaq Global Market (unless the security was dually listed on another U.S. market prior to January 1, 2004 and has continuously maintained such listing);
- the security must be issued by a non-financial company, as defined in the Nasdaq rules;
- the security may not be issued by an issuer currently in bankruptcy proceedings;
- a security must have average daily trading volume of at least 200,000 shares (measured annually during the ranking review process);
- if the issuer of the security is organized under the laws of a jurisdiction outside the U.S., then such security must have listed options on a recognized options market in the U.S. or be eligible for listed-options trading on a recognized options market in the U.S. (measured annually during the ranking review process);
- the issuer of the security may not have entered into a definitive agreement or other arrangement which would likely result in the security no longer being eligible for inclusion in the NDX;
- the issuer of the security may not have annual financial statements with an audit opinion that is currently withdrawn;

· the security must have "seasoned" on Nasdaq, NYSE or NYSE American. Generally, a company is considered to be seasoned if it has been listed on a market for at least three full months (excluding the first month of initial listing).

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#### Detailed Initial Eligibility Criteria Listings

For inclusion in the NDX, a security must be listed exclusively on the Nasdaq Global Select Market or Nasdaq Global Market (unless the security was dually listed on another U.S. market prior to January 1, 2004 and has continuously maintained such listing).

#### Security Types

Security types generally eligible for the NDX include common stocks, ordinary shares, ADRs, and tracking stocks. Security or company types not included in the NDX are closed-end funds, convertible debentures, exchange traded funds, limited liability companies, limited partnership interests, preferred stocks, rights, shares or units of beneficial interest, warrants, units and other derivative securities. The NDX does not contain securities of investment companies.

#### Market Capitalization

There is no minimum market capitalization requirement. Inclusion will be determined based on the top 100 largest issuers based on market capitalization meeting all other eligibility requirements. Market capitalization is determined by multiplying a security's "last sale price" by its total shares outstanding.

#### Liquidity

Each security must have a minimum three-month average daily trading volume (ADTV) of 200 thousand shares. The ADTV is determined by the average of the sum product of the security's daily trading volume for each day during the previous three month period.

#### Security Seasoning Criteria

The security must have been traded for at least full three months, not including month of initial listing, on Nasdaq, NYSE or NYSE American.

#### Continued Eligibility Criteria

To be eligible for continued inclusion in NDX, a security must meet the following criteria:

- the issuer of the security's primary U.S. listing must be exclusively listed on the Nasdaq Global Select Market or the Nasdaq Global Market
- the security must be issued by a non-financial company;
- the security may not be issued by an issuer currently in bankruptcy proceedings;
- the security must have average daily trading volume of at least 200,000 shares in the previous three month trading period (measured annually during the ranking review process);
- if the issuer of the security is organized under the laws of a jurisdiction outside the U.S., then such security must have listed options on a recognized options market in the U.S. or be eligible for listed-options trading on a recognized options market in the U.S.;
- the issuer must have an adjusted market capitalization equal to or exceeding 0.10% of the aggregate adjusted market capitalization of the NDX at each month-end. In the event a company does not meet this criterion for two consecutive month-ends, it is removed from the NDX, effective after the close of trading on the third Friday of the following month;
- and the issuer of the security may not have annual financial statements with an audit opinion that is currently withdrawn.

For the purposes of the eligibility criteria, if the security is a depositary receipt representing a security of a non-U.S. issuer, then references to the "issuer" are references to the issuer of the underlying security.

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Index Evaluation

Except under extraordinary circumstances that may result in an interim evaluation, NDX composition is reviewed on an annual basis as follows. Issuer securities which meet the applicable eligibility criteria are ranked by market value. NDX-eligible securities which are already in the index and whose issuer is ranked in the top 100 eligible companies (based on market capitalization) are retained in the index. An issuer that is ranked 101 to 125 is also retained, provided that such issuer was ranked in the top 100 eligible issuers as of the previous ranking review or was added to the NDX subsequent to the previous ranking review. Issuers not meeting such criteria are replaced. The replacement securities chosen are those NDX-eligible securities not currently in the index whose issuers have the largest market capitalization. The data used in the ranking includes end of October market data and is updated for total shares outstanding submitted in a publicly filed SEC document through the end of November.

Replacements are made effective after the close of trading on the third Friday in December. Moreover, if at any time during the year other than the ranking review, an issuer no longer meets the continued eligibility criteria, or is otherwise determined to have become ineligible for continued inclusion in the Index, it is replaced with the largest market capitalization issuer not currently in the Index and meeting the initial eligibility criteria listed above. Ordinarily, a security will be removed from the Index at its last sale price. If, however, at the time of its removal, the security is halted from trading on its primary listing market and an official closing price cannot readily be determined, the security may, in Nasdaq's discretion, be removed at a zero price. The zero price will be applied to the security after the close of the market but prior to the time the official closing value of the NDX is disseminated.

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#### Historical Information

The graph below sets forth the information relating to the historical performance of the Reference Asset. The information provided in this graph is for the period from January 1, 2013 through November 14, 2018.

We obtained the information regarding the historical performance of the Reference Asset in the chart 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 the Reference Asset should not be taken as an indication of its future performance, and no assurance can be given as to the Final Level of the Reference Asset. We cannot give you assurance that the performance of the Reference Asset will result in any positive return on your initial investment.

Invesco QQQ<sup>TM</sup> Trust, Series 1 (“QQQ”)

PAST PERFORMANCE IS NOT INDICATIVE OF FUTURE RESULTS.

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#### 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 September 11, 2018 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, the IRS has issued guidance that states that the U.S. Treasury Department and the IRS intend to amend the effective dates of the U.S. Treasury Department regulations to 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, 2021. 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, 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.

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

Delivery of the Notes will be made against payment for the Notes on November 19, 2018, which is the third (3rd) business day following the Pricing Date (this settlement cycle being referred to as “T+3”). See “Plan of Distribution” in the prospectus dated September 11, 2018. 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 September 7, 2018. We will deliver the Notes on a date that is greater than two business days following the Pricing Date. Under Rule 15c6-1 of the Exchange Act, trades in the secondary market generally are required to settle in two business days, unless the parties to any such trade expressly agree otherwise. Accordingly, purchasers who wish to trade the Notes more than two business days prior to the original Issue Date will be required to specify alternative settlement arrangements to prevent a failed settlement.

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.

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### STRUCTURING THE NOTES

The Notes are our debt securities, the return on which is linked to the performance of the Reference Asset. 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 Asset, 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 discount and our estimated hedging costs. These factors resulted in the initial estimated value for the Notes on the Pricing 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.

### 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 September 7, 2018, which has been filed as Exhibit 5.1 to Royal Bank's Form 6-K filed with the SEC dated September 7, 2018. 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 September 7, 2018, which has been filed as Exhibit 5.2 to the Bank's Form 6-K dated September 7, 2018.

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