February 26, 2021

***By Electronic Delivery Through the FHFA Website and [AppraisalRFI@fhfa.gov](mailto:AppraisalRFI@fhfa.gov)***

Mr. Clinton Jones
General Counsel, Federal Housing Finance Agency
Constitution Center, Eighth Floor (OGC)
400 7th Street SW, 9th floor
Washington, D.C., 20219

Re: Request for Information on Appraisal-Related Policies, Practices, and Processes

Dear Mr. Jones:

Freddie Mac appreciates the opportunity to respond to the thoughtful questions raised in the Federal Housing Finance Agency's (FHFA) Request for Information on Appraisal-Related Policies, Practices, and Processes (RFI).

Since its creation in 1970, in its capacity as a government sponsored enterprise with a mission to promote robust access to mortgage credit for borrowers across the nation, Freddie Mac has led the way in developing new technologies and analytic capabilities in the property valuation space. Ensuring the mortgages we purchase are secured by properties for which the value has been accurately assessed is vital to the success of our business.

While it has historically been our practice to require full interior and exterior inspection appraisals for the mortgages we purchase, we have found that there is a growing need in the market for appraisal modernization, including technological and data driven solutions and other appraisal alternatives. We continue to explore safe and sound property valuation methods. We also believe it is in the best interest of the mortgage industry and consumers for us to continue our appraisal modernization efforts, including new technological innovations and appraisal alternatives.

As described in more detail below, we discuss: 1) the need for appraisal modernization and alternatives to full interior and exterior inspection appraisals, 2) steps we have already taken to modernize the valuation process, including our Automated Collateral Evaluation (ACE) offering, and 3) the need to better understand the potential for bias with the use of various appraisal methods. We continue to explore opportunities for further innovation and development in the valuation space to enhance safety and soundness by obtaining valuations that are as accurate as possible.

**Appraisal Modernization**

Freddie Mac supports modernization of the appraisal process to ensure quality valuations that foster prudent risk management. Freddie Mac has long been at the forefront of innovation in the appraisal

process and it is important that we continue to improve and modernize in this space. Mortgage lending is collateralized lending. Ensuring the accuracy of property valuations such that the mortgages we purchase are adequately collateralized is critical to our long-term business success. In particular, in order to mitigate default risks, it is crucial that we purchase mortgages supported by reliable and appropriate valuation methods. This objective guides our efforts to develop new and enhance existing solutions spanning across the valuation spectrum.

Although the appraisal process has improved as a result of Enterprise efforts such as the Uniform Appraisal Dataset (UAD), Appraiser Independence Requirements (AIR), and the development of appraisal risk assessment tools such as Loan Collateral Advisor, additional opportunities exist for safe and sound innovation in the valuation space. Freddie Mac continues to explore opportunities to improve the property valuation process for our own risk mitigation purposes, while also addressing industry pain points.

In 2020, in connection with COVID-19, Freddie Mac offered the industry additional appraisal flexibilities to ensure consumers and appraisers had safe options for completing property appraisals. Freddie Mac added the option to use appraisals based on an exterior-only inspection or a "desktop" appraisal with no property inspection for certain mortgages. Examination and testing of hybrid, exterior-only and desktop appraisals should continue, with the aim being to identify the optimum risk management tool for each circumstance. However, these flexibilities alone do not account for the full universe of alternatives that should be considered.

Existing appraisal methods, including those offered during the pandemic, such as hybrids, desktops, and exterior-only appraisals all currently rely on the same basic scope of work and reporting structure, with the only significant difference being how information about characteristics of the subject property are collected. They rely on the same basic valuation methodology – the traditional sales grid, often presented without support for adjustments. Modernization of the appraisal process must include consideration of elements other than the nature and extent of property inspection. Modern technology should be applied to all facets of collateral analysis – data/information collection, analysis of that data, and reporting the results.

Modernization efforts that incorporate greater use of available data and provide more transparent reporting of the analysis of that data will benefit end users by enhancing the reliability of the appraisal results. These efforts must include exploring the application of valuation methods that use medium or large data sets and include supporting analytics within the report. Appraisal modernization efforts should focus more on the development of a data driven appraisal process in addition to inspection methodology and data collection. While the collection of relevant data about a property is important, the focus should rather be on modernizing the valuation techniques and methods of analysis that lead to the valuation conclusion, as such techniques and methods have not changed significantly in decades. Modernization efforts that deal primarily with valuation analysis are more likely to offer a higher level of improvement in the reliability of values.

**Concerns with relying only on the traditional full interior and exterior appraisal**

While full interior and exterior appraisals have many benefits, there are issues that need to be addressed. A traditional appraisal does not always result in a more accurate value than an appraisal alternative. Academic literature provides strong evidence that relying on properly designed and deployed Automated Valuation Models (AVMs) results in superior collateral valuation, lower defaults, and lower credit losses. It is crucial that we continue to innovate, explore, and develop appraisal alternatives, including the use of AVMs, to help ensure we achieve the highest level of valuation accuracy.

The traditional appraisal has proven to be reliable and useful and should remain an important part of the valuation spectrum. In fact, the traditional appraisal is the most common valuation method used for the mortgages we purchase today. However, there is opportunity for improvement in the analysis reported in the traditional appraisal. For example, the traditional sales grid listing three comparable sales and potentially unsupported adjustments developed for the technology of the 1970s. With modern technology there is no need to limit analysis to three comparable sales (a number driven in large part because that is how many could conveniently fit on a sheet of paper), and there is no reason not to include additional support for the adjustments provided. There are many tools available today that can aid valuation providers in supporting such adjustments in their reports.

One concern with relying solely on full interior and exterior appraisals is the potential market shortage of appraisers, especially in certain markets and during periods of high demand. The production of traditional appraisals is inherently linked to the supply of appraisers. Because of the time required to obtain appraiser credentials, the supply of appraisers is relatively static. In times of peak demand (e.g. 2020) the supply of available appraisers cannot quickly expand to meet market demand. Regardless of market demand, the supply of available qualified appraisers may be very limited in areas with smaller populations, creating unnecessary challenges and delays for borrowers in these communities. For these situations, valuation options should be expanded to include alternative valuation methods when those methods can provide similar risk management.

Another concern with traditional appraisals is that the appraiser's determination of value involves a high degree of subjective analysis. The definition of "market value" used in traditional appraisals refers to the "most probable" price – a statistical concept. However, unlike the results of automated valuations, the results reported in traditional appraisals offer no indication of the degree of certainty associated with the results. In other words, traditional appraisals present no indication of confidence level (as measured by a metric such as forecast standard deviation) associated with the value conclusion. As a result, risk managers are left to subjective analysis based on other report content. Integrating the use of existing tools that would allow appraisers to mathematically derive, and report, a confidence level associated with the appraiser's opinion of value could allow end users to better understand and interpret the appraisal results.

Finally, numerous studies and journal articles have documented that appraisals are subject to bias and anchoring in predictable ways. Cho and Megbolugbe (1996) first noted the striking empirical finding that appraisal values were rarely lower than the purchase price, and that a surprisingly high fraction were exactly at the purchase price. Since then, many other empirical studies (e.g., Chinloy et al. (1997) through Yiu et al. (2006), Nakamura (2010), Ding (2014), and Eriksen et al. (2016)) have found similar distributions and systematic differences between appraised values and true market prices. Appraisal bias

and inaccuracy are correlated with higher defaults, as found by LaCour-Little and Malpezzi (2003), and Agarwal et al. (2015)[1]

One salient 2018 paper published by Calem et al., economists at the Federal Reserve Bank of Philadelphia and Wharton, states in the Abstract, "We lay out a basic theoretical framework to explain how appraisers' incentives within the institutional framework that governs mortgage lending lead to information loss in appraisals (that is, appraisals set equal to the contract price). Consistent with the theory, we observe a higher frequency of appraisal equal to contract price and a higher incidence of mortgage default at loan-to-value boundaries (notches) above which mortgage insurance rates increase. Appraisals appear to be less informative for default risk measurement compared with automated valuation models."  The authors go on to establish that some 30% of all appraised values are exactly the initial contract price; and only 10%—not 50% as would be expected if appraisals were unbiased—are below the contract price. The information loss in appraised values is associated with higher default rates. In contrast, AVMs invariably show healthy, symmetric, mound-shaped distributions centered at contract prices, indicative of lack of bias or anchoring.

**Freddie Mac's alternative to traditional appraisals also delivers comparable or better loan performance**

To mitigate risks inherent in traditional appraisals, Freddie Mac successfully implemented an automated collateral evaluation tool, Automated Collateral Evaluation (ACE), and is in the process of researching, exploring, developing and testing other alternatives to the full traditional interior and exterior appraisal. ACE is a valuation tool that provides numerous benefits to Freddie Mac, the mortgage industry, and to consumers. Our analysis has shown that, compared to traditional appraisals and holding all other relevant characteristics constant, ACE results in default rates equal to or less than the default rates of mortgages that have traditional appraisals.

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[1]  Agarwal, Sumit, Itzhak Ben-David and Vincent Yao, 2015, Collateral Valuation and Borrower Financial Constraints: Evidence from the Residential Real Estate Market, *Management Science*, 61(9), 2220-2240; https://pubsonline.informs.org/doi/abs/10.1287/mnsc.2014.2002 Calem, Paul, Lauren Lambie-Hanson, Leonard Nakamura, and Jeanna Kenney, 2018, Appraising Home Purchase Appraisals, Working Paper WP 18-28, Federal Reserve Bank of Philadelphia, December; https://philadelphiafed.org/-/media/research-and-data/publications/working-papers/2018/wp18-28.pdf Chinloy, Peter, Man Cho and Isaac Megbolugbe, 1997, Appraisals, Transaction Incentives, and Smoothing, *Journal of Real Estate Finance and Economics*, 14, 89-111; https://www.researchgate.net/publication/5151456_Appraisals_Transaction_Incentives_and_Smoothing Cho, Man and Isaac Megbolugbe, 1996, An Empirical Analysis of Property Appraisal and Mortgage Redlining, *Journal of Real Estate Finance and Economics*, 13, 45-55; https://link.springer.com/article/10.1007%2FBF00174550 Ding, Lei, 2014, The Pattern of Appraisal Bias in the Third District During the Housing Crisis, Working Paper, Federal Reserve Bank of Philadelphia; https://www.philadelphiafed.org/-/media/community-development/publications/discussion-papers/discussion-paper_pattern-of-appraisal-bias.pdf  Eriksen, Michael, Hamilton Fout, Mark Palim and Eric Rosenblatt, 2016, Contract Price Confirmation Bias: Evidence from Repeat Appraisals, Working Paper, Fannie Mae; https://www.fanniemae.com/resources/file/research/datanotes/pdf/working-paper-102816.pdf LaCour-Little, Michael and Stephen Malpezzi, 2003, Appraisal Quality and Residential Mortgage Default: Evidence from Alaska, *Journal of Real Estate Finance and Economics*, 27, 211-233; https://www.researchgate.net/publication/5151704_Appraisal_Quality_and_Residential_Mortgage_Default_Evidence_from_Alaska Nakamura, Leonard, 2010, How Much Is That Home Really Worth? Appraisal Bias and House-Price Uncertainty, *Business Review*, Federal Reserve Bank of Philadelphia, 2010 Q1; https://philadelphiafed.org/-/media/research-and-data/publications/business-review/2010/q1/brq110_home-worth-appraisal-bias.pdf Shui, Jessica and Shriya Murthy, 2018, Are Appraisal Management Companies Value-Adding? Stylized Facts from AMC and Non-AMC Appraisals, Working Paper 18-01, FHFA; https://www.fhfa.gov/PolicyProgramsResearch/Research/PaperDocuments/wp18-01.pdf Yiu, C., S. Tang, H. Chiang and T. Choy, 2006, Alternative Theories of Appraisal Bias, *Journal of Real Estate Literature*, 14(3), 321-344; https://aresjournals.org/doi/abs/10.5555/reli.14.3.l46285686w575m91

The increase in the availability of big data, machine learning and cloud computing enabled Freddie Mac to develop and implement ACE. ACE leverages Freddie Mac's in-house AVM, Home Value Explorer® (HVE). Unlike most commercially available AVMs, HVE was built and is continually enhanced for the express purpose of managing collateral risk at Freddie Mac (a subtly and slightly different goal than maximizing pure predictive accuracy). HVE is used throughout the organization to support important functions such as pricing, costing and quality control (QC); the company devotes significant resources towards ongoing development and improvement of HVE's accuracy, precision, and coverage. HVE relies on multiple sources of information, including but not limited to, public records, MLS information, appraisal data, and GSE funding data, and provides both a predicted value and a confidence score. ACE combines HVE with multiple predictive analytics including a condition model. ACE's design is deliberate and deployed for risk management. ACE leverages statistically based, empirically derived confidence scores. An ACE appraisal waiver will only be offered when the confidence score in HVE's predicted value is sufficiently high based on factors including the availability of data (e.g., appraisal, MLS, public records).

In addition to comparable or better loan performance, ACE increases efficiency by streamlining the lenders' origination process and provides cost savings to borrowers. Freddie Mac estimated that in 2020 the use of ACE saved consumers $665 million in appraisal costs. Use of ACE also increases available appraiser capacity by freeing up appraisers to focus on those assignments where automated models do not produce appropriate results and an appraiser's expertise and judgment is required.

**Loan Performance: Appraisal Waivers vs. Interior and Exterior Inspection Appraisals**

As more fully described below, Freddie Mac has analyzed loan performance for mortgages originated using AVMs in lieu of traditional appraisals and has found that the use of AVMs can result in mortgages that perform as well as mortgages with traditional appraisals.

*Historical Appraisal Waiver Offerings: Performance Data*

Prior to the development of ACE, between 2002 and 2010, Freddie Mac implemented several offerings leveraging the use of HVE to allow the sale of mortgages without traditional appraisals. These earlier offerings did not include the robust data-based condition assessments incorporated in ACE today. Still, when we compared the performance, as measured by the 120-day delinquency rate and default cost, of mortgages sold to Freddie Mac leveraging HVE with those mortgages with similar risk characteristics originated with traditional appraisals, we found that the mortgages leveraging HVE performed as well as the mortgages supported by traditional appraisals, even though these mortgages existed during the greatest housing and financial crisis since the Great Depression.

*ACE Appraisal Waiver: Performance Data*

Freddie Mac has been monitoring the performance of mortgages delivered with an ACE appraisal waiver (ACE mortgages) for the past 42 months and we have found that ACE mortgages have performed at least as well as mortgages with similar loan characteristics originated with traditional appraisals (Table 1). Even as delinquency rates increased drastically as a result of COVID-19 in 2020, ACE mortgages

continued to outperform mortgages within the ACE credit box that were originated with traditional appraisals.

Table 1 ACE Loan Performance Comparison

**Loan Performance - Ever 90 Day Delinquency Rate**
**LPA Flow loans by Funding Period**
**Status as of December 31, 2020**

| | Funding Period | | | | | |
|---|---|---|---|---|---|---|
| | 2017 | 2018 | 2019 | 2020Q1 | 2020Q2 | Total |
| **Total Loans** | Loan Count | Loan Count | Loan Count | Loan Count | Loan Count | Loan Count |
| ACE funded loans | 11,106 | 39,964 | 171,404 | 89,247 | 268,725 | 580,446 |
| ACE Peer Group[2] | 106,098 | 151,734 | 206,353 | 55,590 | 152,175 | 671,950 |
| **Avg FICO** | | | | | | |
| ACE funded loans | 749 | 755 | 759 | 761 | 763 | 761 |
| ACE Peer Group[2] | 753 | 753 | 756 | 757 | 757 | 755 |
| **Avg LTV** | | | | | | |
| ACE funded loans | 68 | 67 | 67 | 66 | 66 | 67 |
| ACE Peer Group[2] | 69 | 70 | 69 | 68 | 66 | 69 |

| Ever 90 Day Delinquent Rate | Loan Count | bps | Loan Count | bps | Loan Count | bps | Loan Count | bps | Loan Count | bps | Loan Count | bps |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| ACE Funded Loans | 229 | 256 | 879 | 246 | 3,446 | 221 | 1,658 | 213 | 1,379 | 58 | 7,591 | 147 |
| ACE Peer Group[2] | 2,689 | 316 | 3,843 | 288 | 4,992 | 261 | 1,305 | 253 | 1,074 | 77 | 13,903 | 232 |
| | | better | | better | | better | | better | | better | | better |

Notes: 1. Excluded loans in disaster areas that Freddie Mac owned before disaster dates.
2. ACE Peer Group is defined as loans within ACE Credit Box but delivered with an appraisal.

To further study the effectiveness of HVE and its appropriate use within ACE, the Office of the Chief Economist at Freddie Mac completed analysis that evaluated the precision of appraisals used in connection with refinance mortgages ("Evaluating the Accuracy of Home Appraisals Using Refinance Transactions", Liyi Liu et al.). The study evaluated refinance loans that Freddie Mac purchased prior to, during, and after the Great Recession. The study compared the predictive power of a default model using an HVE-based LTV versus an appraisal-based LTV to determine which valuation method better predicted actual loan performance. The approach partitioned the loan data by HVE confidence score, as measured by Forecast Standard Deviation (FSD) and fit regression models to predict mortgage default. Study results concluded that appraisal performance improved after Appraiser Independence Requirements went into effect. The study also concluded that at certain FSD levels HVE-based LTV ratios were better predictors of loan performance than appraisal-based LTV ratios. ACE's design specifically leverages HVE's FSDs to ensure prudent risk management.

This improved performance can be explained by Freddie Mac's properly designed and monitored collateral valuation program. Property value is a critical input to a mortgage's loan-to-value ratio, a key determinant of borrower credit risk. Ensuring valuations are not negatively influenced by mortgage industry participants who engage in activities that manipulate the results is a core tenant across all valuations supporting mortgage lending. It is imperative to engage in prudent, rigorous and on-going monitoring for all types of valuations including appraisals and ACE to manage these risks.

In addition to effectively managing risk, a properly designed and monitored collateral valuation offering such as ACE supports Freddie Mac's affordable lending mission. In 2020, 37% of the Low Income

Refinance (LIR) qualifying Home Possible mortgages sold to Freddie Mac were ACE mortgages, saving borrowers $500-$700 in closing costs and reducing the time to originate a mortgage by 7 to 10 days. In addition, 18.5% of the mortgages delivered to Freddie Mac that qualified for Duty to Serve in high needs rural areas were ACE mortgages.

Currently, lenders have a binary choice when it comes to originating mortgages that are eligible for sale to Freddie Mac. They can deliver a mortgage that meets our requirements for an ACE appraisal waiver, or they can obtain a traditional appraisal. As described above, we currently offer appraisal flexibilities due to COVID-19, but those solutions have not been adopted into our permanent policy. The efficacy of the flexibilities permitted during the COVID-19 pandemic should be studied to explore whether those offerings should be made permanent. In addition, further innovation in the valuation space is needed to ensure we are optimizing risk management and responding to market demands for more modern processes.

**Addressing the GREY AREA, People + Technology**

Freddie Mac continues to explore and innovate further in the valuation space to ensure our collateral valuations are as accurate as possible, and to provide solutions that address market gaps and inefficiencies. This exploration includes appraisal centered valuations, technology, and data centered valuations, and solutions that include aspects of both traditional appraisals and the use of technology and data.

The graphic below illustrates a range of potential valuation options, ranging from a full interior and exterior appraisal on the right, to an ACE appraisal waiver, a fully automated solution with no physical inspection, on the left.



**Valuation Spectrum**

| Non-Appraisals | | Appraisals | | | |
|---|---|---|---|---|---|
| ACE | Interior/Exterior Property Data Report powered by Analytics | Exterior/Desktop Appraisals Powered by Analytics | Regression Analytics Appraisals | Hybrid Appraisal | Interior/Exterior Inspection URAR Appraisal |

Many of the most advantageous advances in appraising will come from innovating in the 'grey' space that lies between fully automated valuations such as ACE and a full interior and exterior inspection appraisal. It is imperative that Freddie Mac continue to innovate in this grey space. Smart innovation and risk management means having a broad spectrum of risk analysis tools and using the tool or combination of tools best suited for the risk profile of the loan and the property.

**Hybrid Appraisals**

In the last few years, Freddie Mac has been evaluating the efficacy of a hybrid appraisal solution. A hybrid appraisal allows a trained individual, not necessarily an appraiser, to gather property characteristics by visiting the subject property and allowing the appraiser to leverage this information in developing the appraisal. Potential benefits of the hybrid appraisal being tested include greater efficiency and less potential for bias. Allowing appraisers to focus on the analysis rather than the data collection could allow them to be more efficient, potentially addressing capacity issues in the market. This could be critical in times of market stress, given the static nature of the appraiser supply noted earlier. Furthermore, we are exploring whether there is a potential for appraisers to be influenced during a property inspection, which may affect value opinions and condition ratings.

We continue to look for other ways to innovate in the 'grey space' with a focus on the best use of technology and data and explore new technologies to support ancillary services such as final inspections. Leveraging data driven technologies could provide a more robust/comprehensive record of the subject property, even in situations where a traditional appraisal is obtained. Innovation should include testing new technologies like 3D Scans (tools that render three dimensional depictions of homes rather than just two-dimensional floorplan layouts) and other mobile applications used to collect and/or process data. It also includes following through with the joint GSE Uniform Appraisal Dataset project, a primary benefit of which is transforming information currently collected in free-form text into discrete data fields allowing for more efficiency in creating and reviewing appraisal reports, and enhancing end users' abilities to improve risk management.

**Valuation Disparities for Minority Borrowers and Neighborhoods**

With respect to disparities in value determinations for minority borrowers and in minority neighborhoods, few studies have been conducted to determine whether the anecdotal appraisal problems discussed in the press are common and systemic in nature and whether automated valuation models could improve the valuation process.[2] Unfortunately, these early studies suffer from serious research limitations that reduce their value. For example, one recent study uses appraisals on closed transactions and relies on an unconventional survey method to address sample selection bias.

The public policy implications of potentially biased appraisals are enormous. When appraisals result in properties that are under-valued, willing buyers and sellers are often unable to complete their transaction unless the sales price is reduced. Those buyers and sellers lose out as do the real estate agents, mortgage lenders, and home insurers who attempted to close the deal. Property owners in the neighborhoods where properties are under-valued are also harmed as their home values are depressed by systematic under-valuation and its adverse effect on those markets. Opportunities to accumulate wealth are undercut as properties are devalued. Whatever the explanation, a consequence of such under-valuation is that it is more difficult to sell homes in African American communities, which leads to lower property values and wealth accumulation for members of those communities.
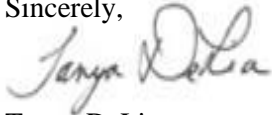
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[2] [1]("Evaluating the Accuracy of Home Appraisals Using Refinance Transactions"), Liyi Liu et al.
https://safe.menlosecurity.com/https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3712424

Given the immense public policy implications of disparities in appraisal valuations in neighborhoods with higher concentrations of minority borrowers, it is important to ensure adequate study and research has been conducted on these issues and that these issues are appropriately addressed. Innovations and development in the valuation space may be crucial to addressing such issues.

Sincerely,

Tanya DeLia
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Single Family Risk Management
Freddie Mac