Mining investments are based on estimations and predictions of the value of natural reserves and are naturally associated with high uncertainties. Their effect is critical for project's performance. As a result, success of mining operations relies on sound financial risk assessment and management, which is crucial particularly at the exploration stage of the project, during reserves estimation. However, complexity and uncertainty associated with this task requires application of increasingly advanced quantitative methods. Recent developments in high dimensional statistics, pattern recognition and machine learning provide a variety of methods which can be used for resource modelling and efficient decision support in planning of mining operations. This paper presents a novel methodology for predicting gold grades at the exploration stage. Our approach encompasses an analysis of heterogeneity in the geological data from the viewpoint of high-dimensional statistics. Due to built-in strict parameter selection and enhanced predictive performance, our technique provides a realistic modelling infrastructure. We apply high-dimensional penalised regression to address the problem of geological uncertainty and determine worthwhile targets missed during exploration. The proposed method delivers a tool which can answer questions related to the shape, the tonnage and the ore grades of the explored ore body, reducing thereby the exploration costs.