At c. 820 km in diameter, the Smythii impact basin is one of the large lunar basins (>200 km diameter) thought to have formed during the Pre-Nectarian period. We combine Lunar Reconnaissance Orbiter imagery, topography, and Moon Mineralogy Mapper compositional data to interpret the surface and subsurface geology of the Smythii basin with the goal of identifying dateable impact melt for investigation by a future lunar lander. Surface outcrops exposed on the central peak of the Schubert C crater are identified as uplifted deposits of Smythii impact melt, and a mission concept is illustrated (inset) for sampling these exposures in order to establish the absolute age of the Smythii basin using radioisotopic geochronology. This mission concept is in line with one of the current top-tier priorities for lunar science: determining the age of large basins and thus constraining the impact flux during the Moon’s first billion years, which is a proxy record for the role of impacts on the surface environment and habitability of early Earth and the inner Solar System during this interval.