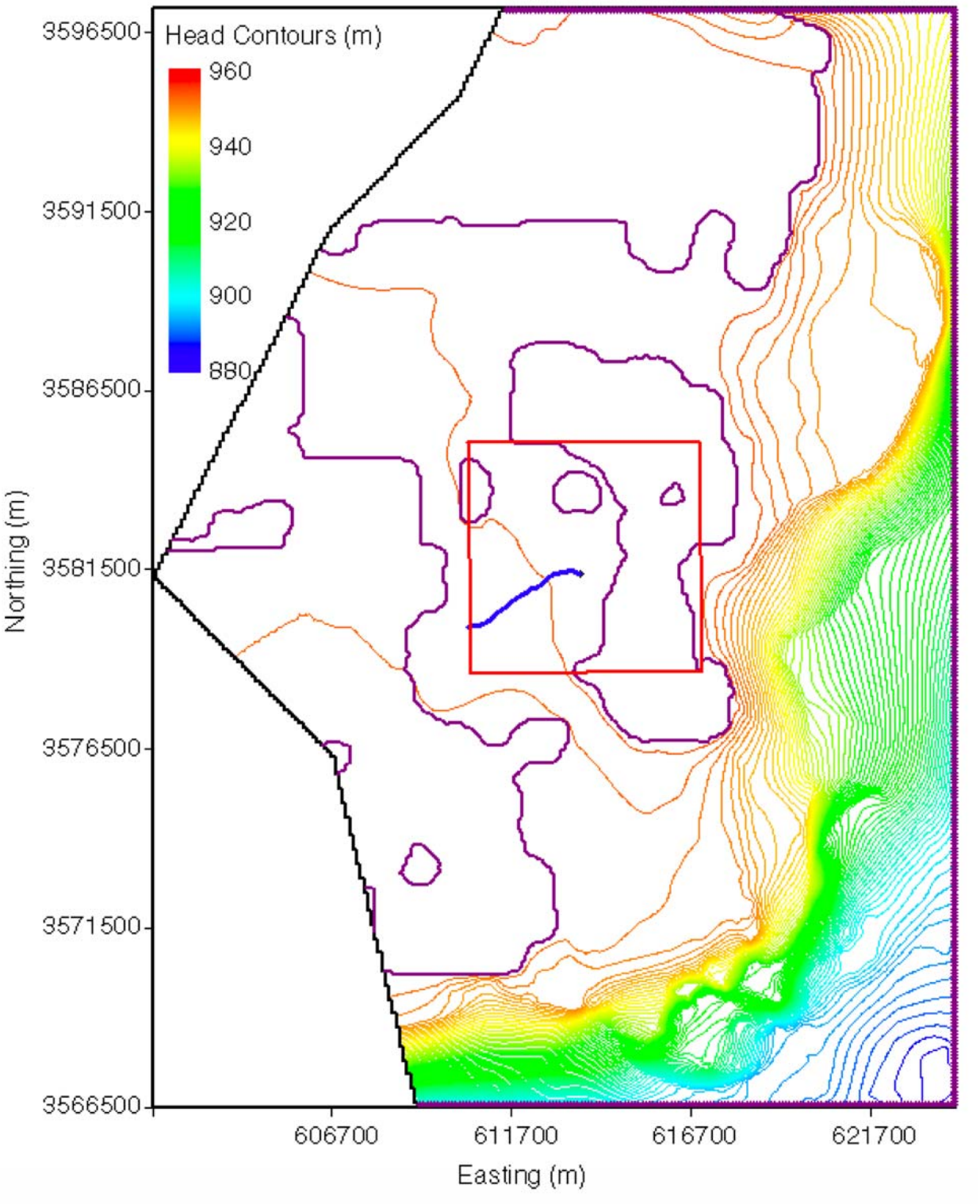

Figure TFIELD-83. Head Contours and Particle Track for the Maximum-Travel-Time T Field (d04r01-R2) for the Full-Mining Case. The WIPP LWB is the red box in the center of the figure and the particle track is the blue track originating from the approximate center of the WIPP.

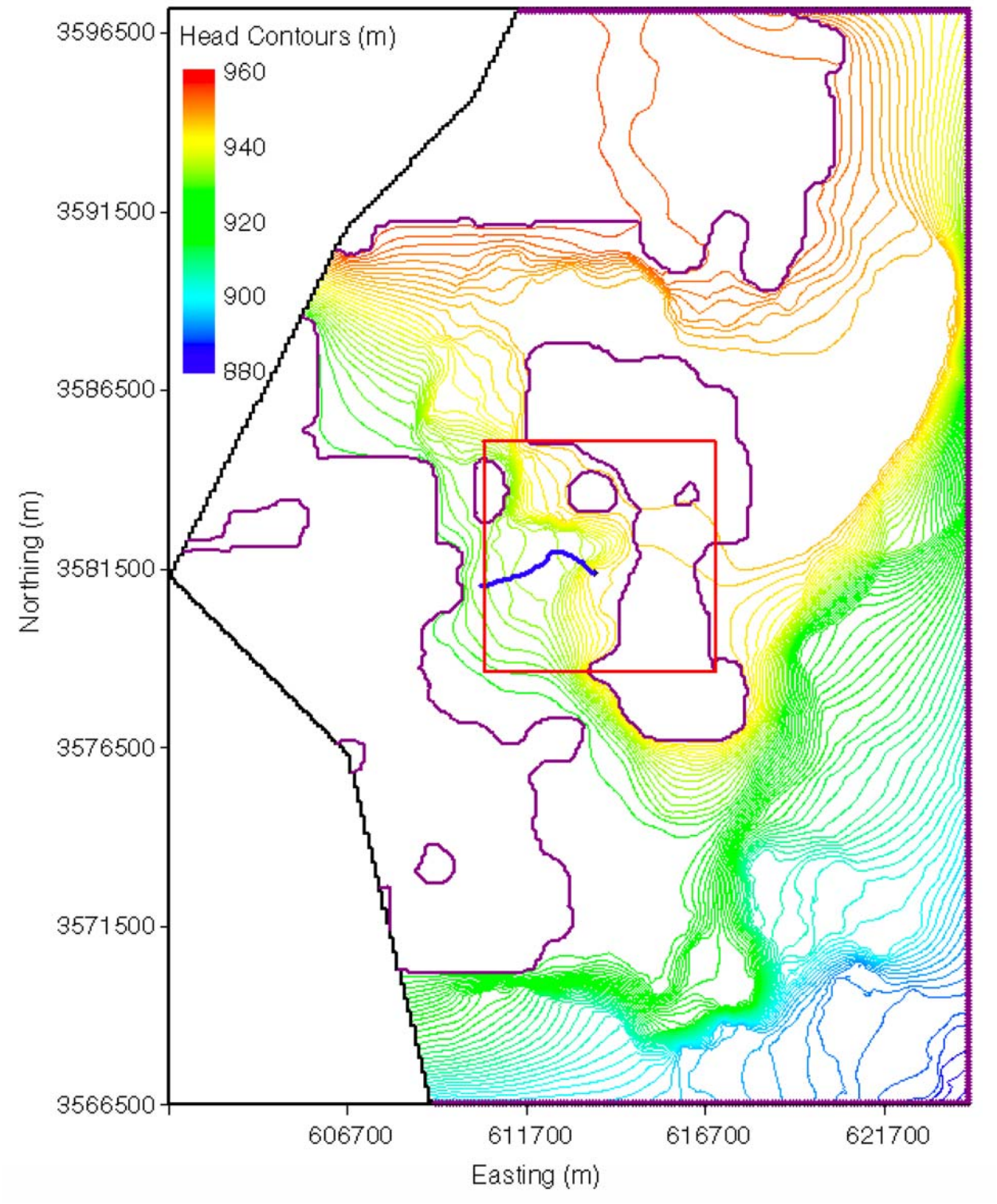

Figure TFIELD-84. Head Contours and Particle Track for the Minimum-Travel-Time T Field (d01r07-R2) for the Full-Mining Case. The WIPP LWB is the red box in the center of the figure and the particle track is the blue track originating from the approximate center of the WIPP.

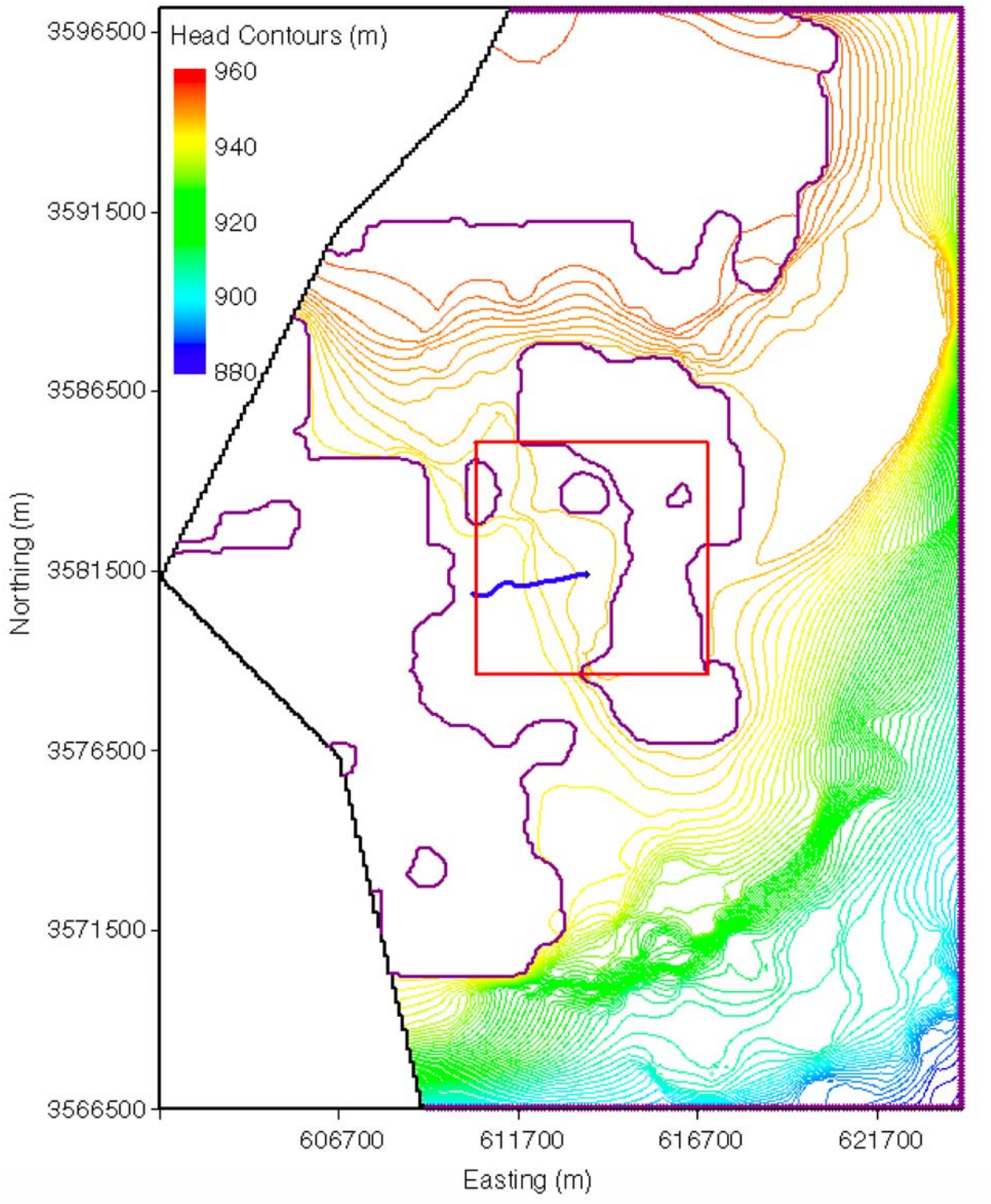

Figure TFIELD-85. Head Contours and Particle Track for the Median-Travel-Time T Field (d10r09-R1) for the Full-Mining Case. The WIPP LWB is the red box in the center of the figure and the particle track is the blue track originating from the approximate center of the WIPP.

can be tested through the collection of additional data. This model was used to create 500 stochastic realizations of the distribution of Culebra T ("base" T fields) in the vicinity of the WIPP site.

A MODFLOW-2000 modeling domain was defined extending 30.7 km (19.1 mi) north-south and 22.4 km (13.9 mi) east-west, roughly centered on the WIPP site. This domain was discretized into 68,768 uniform 100-m (328-ft) by 100-m (328-ft) cells. Water-level measurements made in 37 wells in late 2000 were used to define "steady-state" head conditions and constant-head boundary conditions on the northern, eastern, and southern extremes of the model domain. No-flow boundaries down the arms of Nash Draw, representing flow lines, were used on the western side of the model domain, reducing the number of active cells to 53,769.

MODFLOW-2000 and PEST were used to calibrate 146 of the base T fields to steady-state heads and transient drawdown responses to seven large-scale pumping tests. This calibration was done by using 100 pilot points to adjust the T values within the model domain to improve the fit to the observed heads. The pilot points were used to adjust a residual T field that was combined with a previously created base T field to yield the final calibrated T field. Of the 146 T fields, 121 were judged to be adequately calibrated for use in WIPP compliance calculations by virtue of being from a single population with respect to the CDF of travel times from a point above the center of the WIPP disposal panels to the LWB. From these 121 T fields, the 100 having the best objective fit measures were selected for further use.

The EPA requires that the potential effects of future potash mining be taken into account when evaluating the performance of the WIPP disposal system. Accordingly, transmissivities in the areas within the model domain where current or future mining might affect the Culebra were scaled by a random multiplier between 1 and 1,000 obtained from LHS. A single multiplier was used for each T field, applied first to the areas outside the WIPP LWB that might be mined to create a partial-mining T field, and then to the areas both inside and outside the LWB that might be mined to create a full-mining T field. The LHS was performed three times to create three replicates of T fields, leading to a total of 600 T fields. The MODFLOW-2000 water "budget" files from forward runs of these 600 T fields provided the input to radionuclide-transport calculations using SECOTP2D.

In all cases (no mining, partial mining, and full mining), the particle tracks on the T fields show travel times that are longer than those calculated for the T fields used in the CCA. In the case of the T fields unaltered for the effects of mining, the longer travel times are caused by a shift of relatively high Ts from the southeastern to the southwestern portion of the WIPP site relative to the CCA T fields. In the case of the T fields altered for full and partial mining, the longer travel times are the combined result of the westward shift of high Ts discussed above and a change in the definition of the areas to be mined that resulted in less water entering the Culebra on the WIPP site.

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