Tom's Recommendations

Underpinning existing walls, particularly the common walls is a high-risk operation and must be done with great care. Both facades of the wall should align with the existing wall above and should be vertical with a tolerance of ½". Underpinning walls and footing segments should not exceed 4 ft in length and the existing footing and wall must not be undermined 6" beyond the end of the underpinning segment being constructed. The size of the excavation must be shoved to prevent any earth movement or settlement of the footing or wall. I cannot emphasize strongly enough this necessity.

Do not expose any existing footing except the end adjacent to the underpinning segment being constructed. Do not excavate close to any existing footing than 1:1 slope from the top of the footing to the bottom of the excavation. Complete the excavation as the wall is underpinned 4 ft at a time.

The common wall belongs to two parties and must be underpinned in such a manner that the surface of the wall is as good quality on your neighbor's side as on your side. This requires careful planning and a procedure because you have no access to the neighbor's side of wall. To do any work concurrently or after you construct the underpinning, except by reaching behind each 4ft section of underpinning after the next 4ft segment is excavated and before that segment is formed.

To capture the water running into your basement, you must have drain pipes behind the wall and lower than your basement slab. Since the only time you will have access behind the wall to install the drain pipe is prior to construction of the wall, it must be installed with each 4ft segment of underpinning prior to constructing the underpinning.

The underpinning must form a structural wall. It must support the weight of two houses resting on the wall and it must resist the earth pressure from the unexcavated earth on your neighbor's side of the wall which could cause sliding or overturning or buckling of the wall. During the construction of the underpinning and afterwards, there must be zero settlement of the wall. Any settlement will crack your neighbor's wall above which will make your life miserable.

I have considered the above issues and have a proposed approach that should accommodate the objectives. The following sequence of underpinning construction should be used :

Preparation

1. Excavate the basement to final grade but no closer to any wall than 4ft. Angle the excavation at a slope 1:1 downward from the interior top at the existing wall footing to the excavated grade.
2. Intercept the incoming water by whatever method will work and pipe it into a large tube of constructed water type plywood box with a float-controlled sump pump. You must have place this sump in a hole below final grade to dry up the area.

Excavation and footing

1. Excavate for one segment 4ft wide through the 1:1 slope and under the existing wall and footing. Maintain vertical sides and support the sides with a 2x8 lumber brace tightly to steel stakes driven into subgrade. Excavate beyond the wall to be backside of the footing. Excavate a vertical face above the backside of the footing if the earth will stand. Otherwise slope it back until it is stable.
2. Remove the existing concrete footing from the bottom of the existing wall five long with a jack hammer. If it doesn't break out easily it may be necessary to saw cut the footing in segments. Be

careful not to disturb the existing wall.

3. Excavate the new footing. Use forms if the sides of the excavation are not vertical and stable. Use a plumb bob to ensure the footing is centered on the existing wall above. Form to be 2ft by 4ft by 1ft.
4. Install reinforcing steel in footing form 3 #4 longitudinal 5 ft long (6" protruding from each end) 8" on centers #3 or #4 crossbar 20" long, 12" on centers, all in center of footing vertically. Install #4 bar vertical dowels 12" on centers protruding 6" above top of footing to hold wall form in place later. Install #4 bar ("L" steel 12" on center see sketch number 1.
5. Place concrete in form (3500psi) vibrate to consolidate
6. After 24 hours remove footing forms.

New wall construction

1. Install 2" schedule 40 PVC drain pipe assembly on top of new footing – see sketch number 2.
2. Install back form using pressure treated 3/4" plywood cut in 12" wide boards 4ft long. This back form will remain in place (see sketch 1 and 2). Cut a notch in the bottom board to fit over the 2" pipe.
3. As each 12" board is installed, fill the area behind the board with crushed stone (#5 or #57) complete fill the space between the form and the back excavation face with stone (no earth) up to 12" below bottom of existing wall.
4. Construct the inside concrete wall form with a continuous fill chute above the bottom of the existing wall. As the placed concrete gets firm (about 1 hour), manually remove the concrete in the chute and finish flush with the existing and new wall. Do not remove the form for at least 24 hours after the concrete placement.

Drainage system

1. The underslab drainage should use 4" corrugated perforated polyethylene (HDPE) pipe covered by a geofabric sock. Home Depot has the sock in 100ft rolls. **Perforations should be on top.**
2. The sump end should be deep enough to go **under** the footing.
3. The common wall (and all walls if you wish) should have a 8" schedule 40 as detailed. Keep the pipe separate from the underslab drainage system all the way into the sump.
4. The sump should be at least 3 ft deeper than the bottom of the footing. Use of an 18-24" concrete or HDPE pipe would be good. Pour a concrete bottom.